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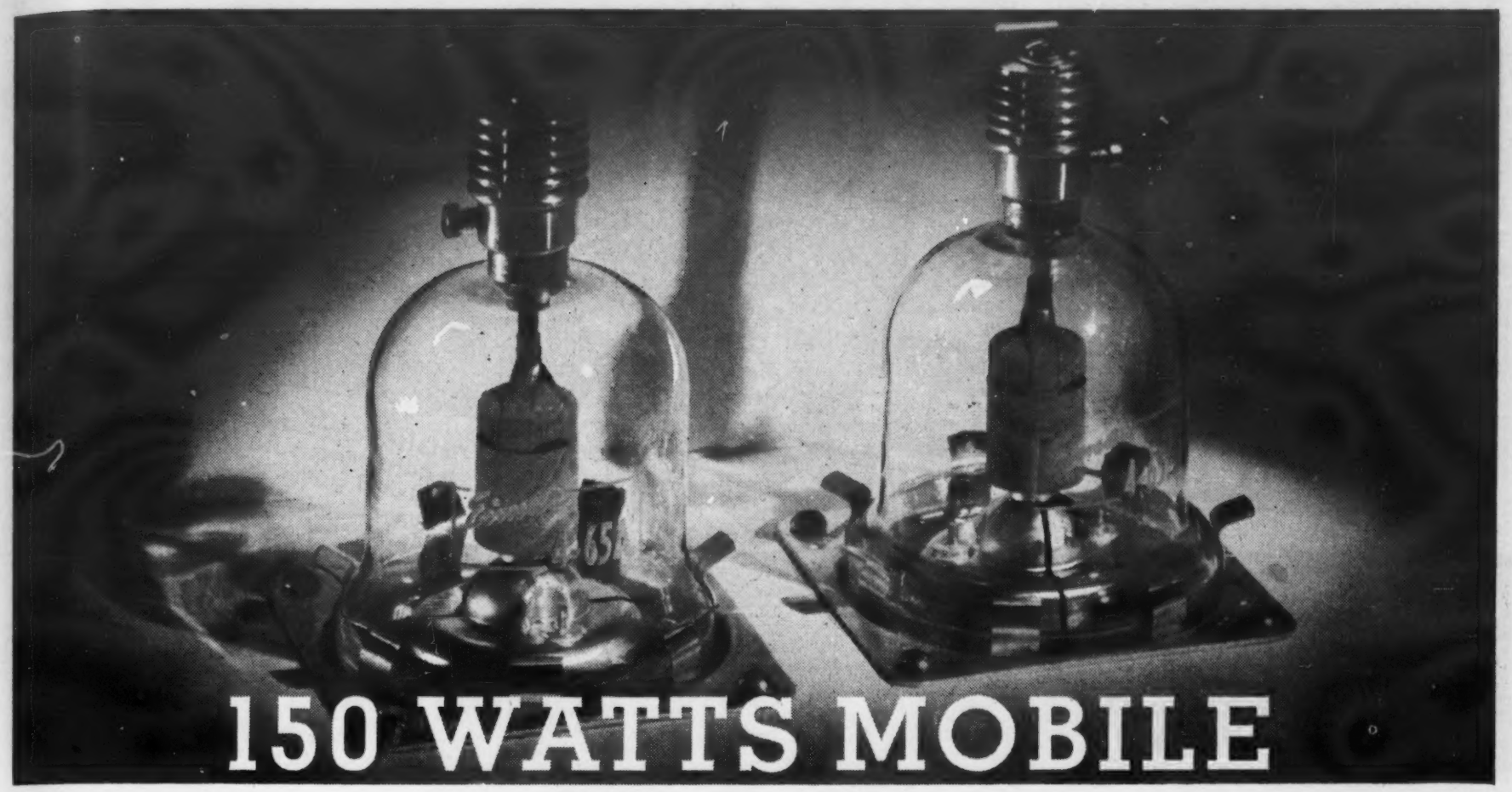

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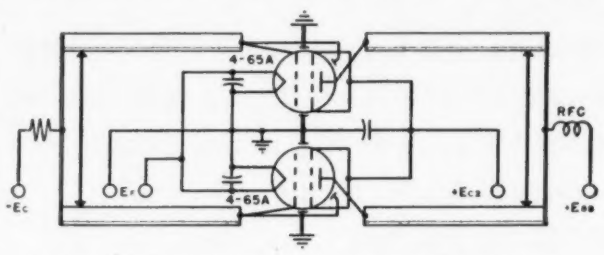

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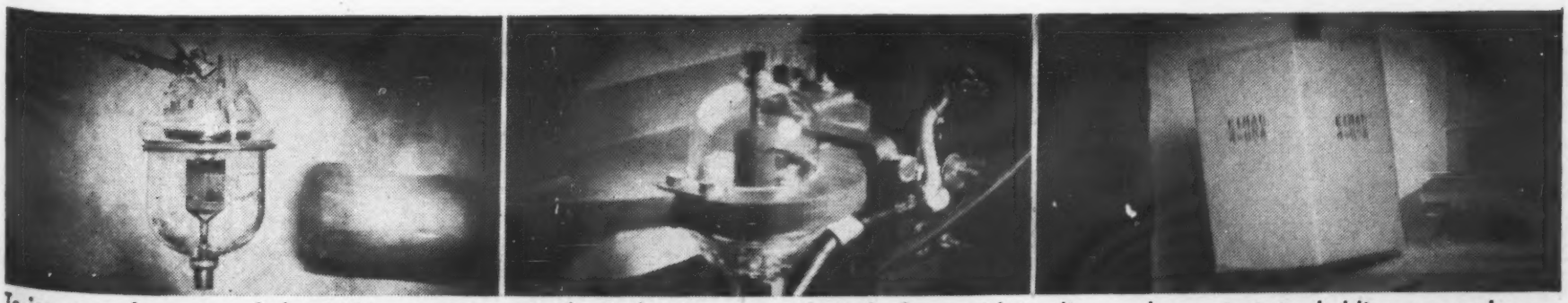

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SIGNALS

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VOLUME 2 NOVEMBER-DECEMBER, 1947 NUMBER 2

CONTENTS

FEATURES

DEPARTMENTS

SIGNALS is published bi-monthly by the Army Signal Association at 804 17th St., N. W., Washington, D. C. Entered as second-class matter at Post Office, Washington, D. C., September 6, 1946, under Act of March 3, 1879. Additional entry at Baltimore, Md.

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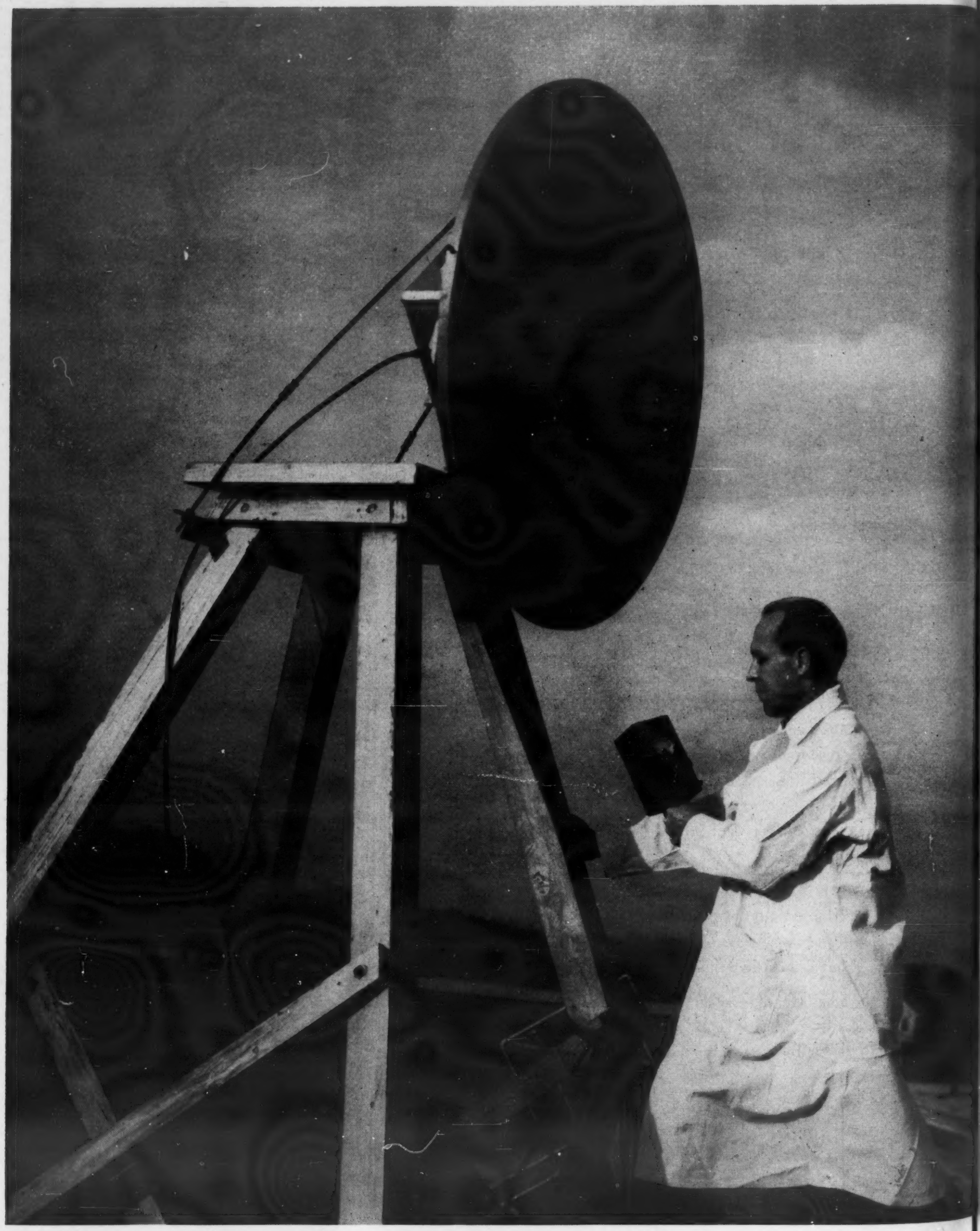
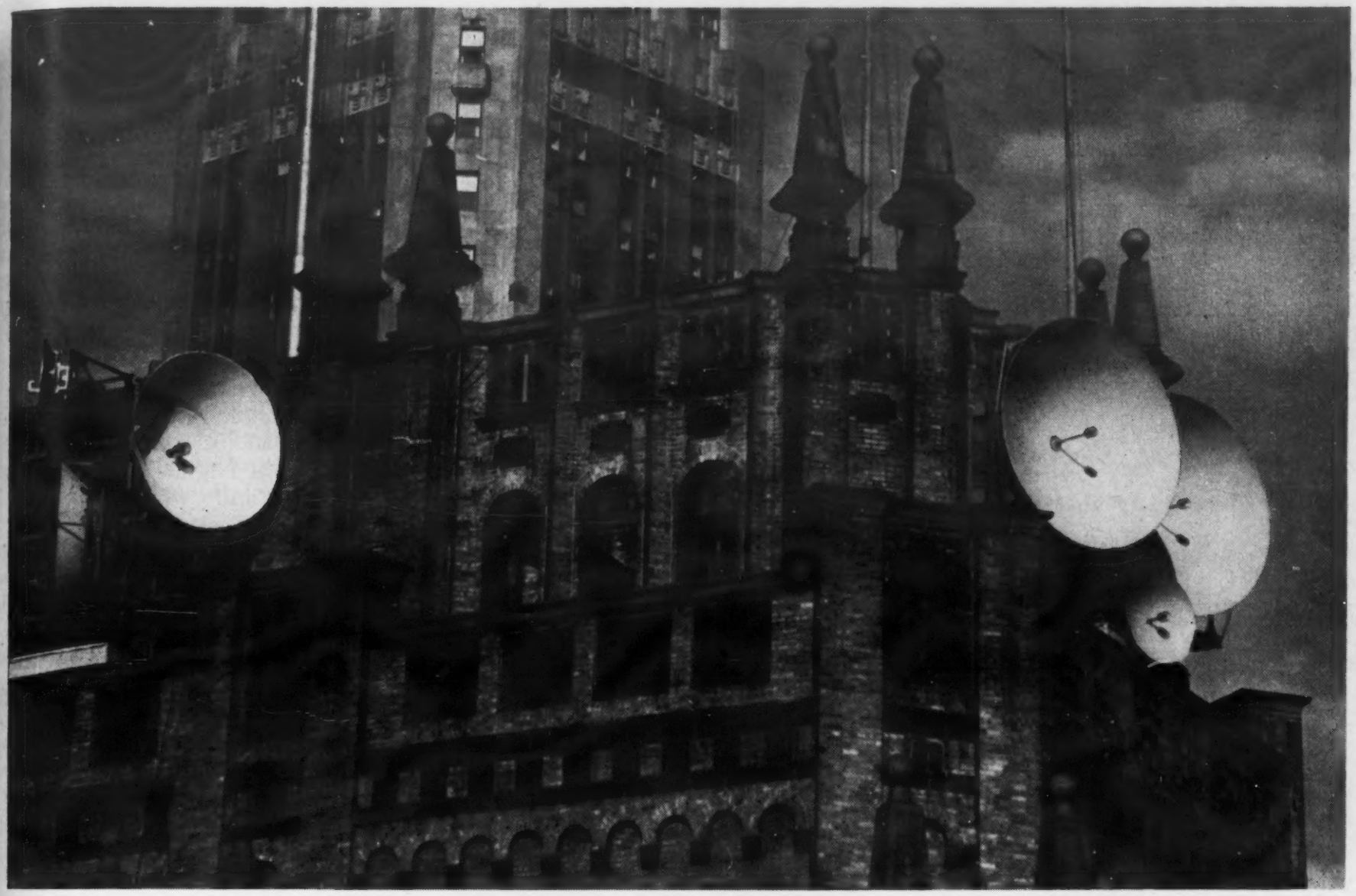
The Cover

"Beeper" pilot watches instruments in radio-controlled drone plane through television scope. Control box guides drone more than 50 miles away. This control box flew a pilotless B-17 2,600 miles, from Hawaii to California. The cover color for this issue is Air Force blue.



Measuring the radiation pattern of the parabolic antenna used in micro-wave relay links.



MICROWAVE RADIO LINKS

By D. D. Grieg and J. Racker
Federal Telecommunication Laboratories

SOMETIME during the last weeks of the European campaign, while General Patton's Third Army was pushing through France and Germany with unprecedented speed, a new system of telephone communication was inaugurated, one which used microwave relay links instead of the conventional telephone lines and poles. This system, which was the only means whereby telephone communications could be extended at a speed that equalled Third Army's advance, may well be the forerunner of an era which will see more poleless, line-less long distance telephone circuits for both civilian and military use.

A radio link, as the name implies, relays the telephone conversations through air rather than by wire circuits. For long distance conversations, a number of repeaters are necessary to perform functions similar to those of repeaters in telephone lines; they receive, amplify, and then re-transmit the original signal. Repeaters are usually designed to have about a 30 to 50 mile separation; however, this distance varies considerably, depending to a large degree upon the terrain. In the European operation, for example, a 277-mile radio link was maintained with three relays, one of the jumps being a 99½ mile leap straight down the broad Rhine valley.

Militarily, the radio link has several important advantages over tlephone lines. Major General William S. Rumbough, formerly Chief Signal Officer of the ETO, made the following statement during a press demonstration of the radio link equipment:

"For communications between higher echelons, radio was an important adjunct to wire because it could be installed so quickly.

The telephone pole may become extinct in the light of recent developments in relay techniques . . .

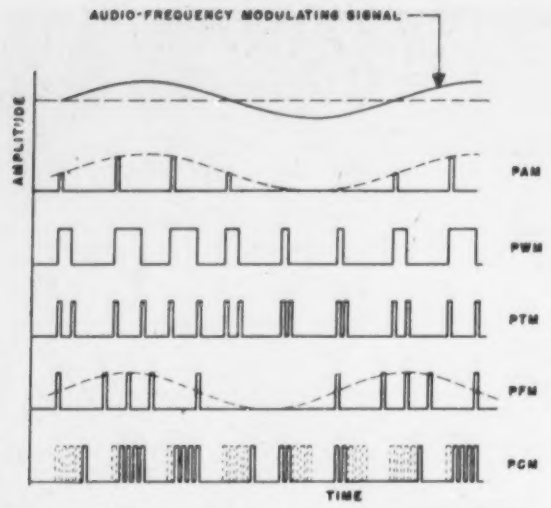


Fig. 1 — Six methods of pulse modulation.

for it — everyone needs it — so that every ton you can save is of importance if you must install it very quickly. A hundred-mile link radio weighs only 25 ship-tons, whereas an equivalent of wire weights 94 ship-tons. When you put in a wire line of say a hundred miles, you assemble four battalions—approximately 2,000 men—and it will take at least 10 days to install the wire, whereas with 30 men you can get your radio relay operation going within two days."

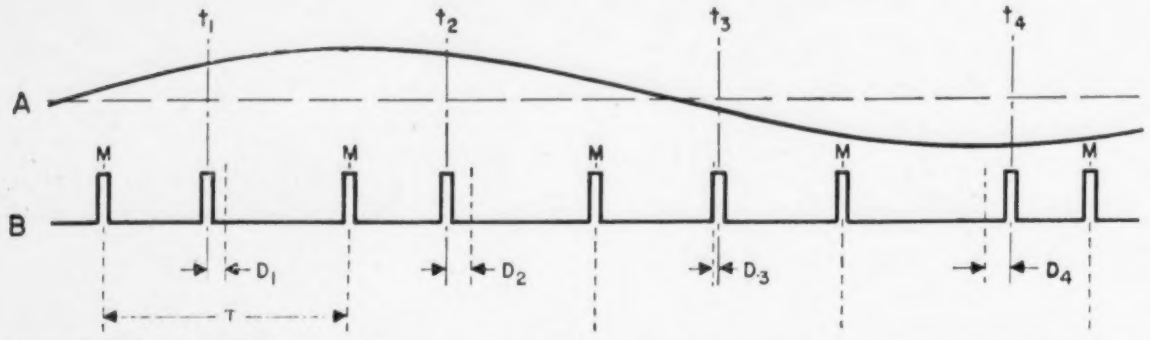


Fig. 2—Pulse modulation method. A is modulating wave and B is time modulated pulse series derived from it. t_1, t_2, t_3, t_4 represent time sampling; D_1, D_2, D_3, D_4 are relative time displacements of pulses corresponding to instantaneous amplitude of modulating signal.

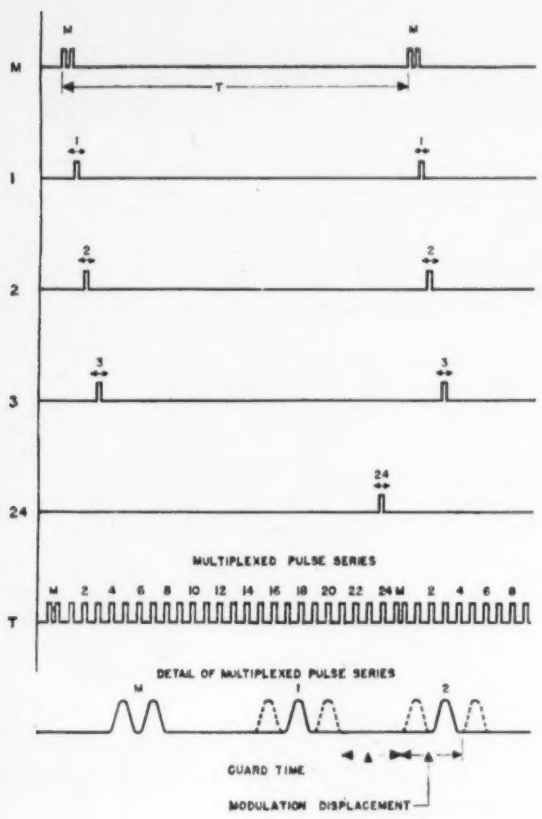


Fig. 3—Time-division pulse multiplex. Waveform diagram shows inter-leaving of pulses of channels. M, 1, 2, 3, 24 are pulses for marker and channels 1, 2, 3, 24. T is total of marker and channel pulses inter-leaved in unmodulated condition. Displacement of unmodulated pulses is indicated by dotted pulses in lower chart; expanded time scale shows pulses round on top with sloping sides.

Another advantage to radio was in transportation; I don't think any person here quite realizes the importance of transportation in the field. You may have something invaluable here, want it hundreds of miles aways, and everyone is asking

24-Channel Link

THESE facts are particularly significant when it is realized that the equipment used in the ETO was of the 8-channel type. Even further savings in time and men are now possible with the use of the 24-channel equipment which has since been developed and put into experimental operation by Federal Telecommunication Laboratories, research unit of the International Telephone and Telegraph Corporation. The large number of channels that can be operated simultaneously in radio link equipment represents another very important advantage. Furthermore, these channels are obtained through the use of very simple circuits and repeaters. An additional feature of the radio link in military operations is its flexibility. A sudden shift of the headquarters location is easily compensated for by merely varying the direction of the beamed signal.

To provide all of the features, a radio link must meet very rigid specifications. The main reason for preference of telephone lines over radio was the greater degree of privacy that telephone lines provided. Radio signals, of course, can be picked up by any suitable receiver located within certain limits determined by the radiation characteristics and power of the transmitting station. Usually these limits are very broad and provide little privacy. To overcome this disadvantage, radio links must confine their radiation to a very narrow beam by the use of highly directive antennas and within distances not greatly exceeding the maximum repeater station separation through the utilization of VHF or "line-of-sight" frequencies.

A high degree of directivity is also desirable for two other reasons. For one, it minimizes interference between the link and any other radio communications operating in nearby areas at the same or adjacent channel frequencies. Secondly, the high power gain obtained from the antenna system enables the use of low power transmitters—the ETO equipment, for example, required only a peak power of 2 watts for relays as great as 100 miles.

The importance of this latter fact becomes evident when the provision of a primary power source for unattended repeaters is considered. Of course, if commercial electric power is available at the repeater site, it can be used and no undue problems are encountered, other than that of forestalling interruption of service. Assume, however, that such a repeater is remotely located from available power sources, which generally will be the case where the system runs through undeveloped territory or takes advantage of isolated high ground. Here a serious problem arises since local power must be supplied. This dictates the use of a local fuel dump if natural sources, such as wind or water, are not available, together with the necessary electricity-generating equpiment. If the repeater is relatively inaccessible, the generator must be capable of supplying power for considerable periods of time without attendance. This, in turn, necessitates efficient, reliable means of generating electric power and also indicates the importance of minimizing power consumption.

Other requirements of the raido link are that it be noise-free, reliable, flexible, easy to manufacture and capable of transmitting a large number of channels simultaneously. It must be easily inegrated with existing wire equipment and readily extended over long distances. From a military viewpoint the equipment must also be simple to install, maintain, and operate. It mst not be too conspicuous nor too bulky, so that it may be transported with ease. These requirements are additional to those normally expected of telephone and radio equipment.

Microwaves

THE SELECTION of microwaves for radio links is based on a number of factors. From a theoretical view-

point, any radio frequency consistent with band-width requirements may be utilized satisfactorily. However, from the practical standpoint, the range of frequencies that can be used is limited.

Except for restricted application in non-populated areas, the frequencies below 100 megacycles-per-second are unavailable because of congestion of other services. Frequencies between 100 and 1000 megacycles are unsuitable since large transmitter powers must be used for reasonable signal-to-noise ratios. This is due to the fact that low power gains are obtained from practical sized antennas. This immediately dictates the use of frequencies above 1000 megacycles where a large number of channels are available and small-sized antennas with high degrees of directivity can be designed.

Use of frequencies above 7000 or 8000 megacycles introduces other problems. Here, small-sized antennas give a high degree of directivity, to such an extent that a severe rigidity requirement is placed on the supporting antenna structures. Lacking such rigidity, there is a possibility that the beam will "miss" the receiving antenna, particularly during adverse weather conditions. A tower that would be sufficiently rigid to avoid "misses" would also be comparatively bulky and conspicuous. Practical considerations, therefore, limit the beam-widths to approximately 1 or 2 degrees.

There are additional reasons for limiting the frequencies to 1000-7000 megacycles. As the frequency is increased, absorption and diffraction effects become increasingly important. Furthermore, power generation, reception, frequency stability, transmission lines, and other allied system factors provide difficulties, although these may only be of a temporary nature as far as future development is concerned.

This brief examination of the range of frequencies suitable for relay operation has been rather general, but if the items indicated are studied in detail, it will be found that the range from approximately 1000 to 7000 megacycles offers the most likely prospects for this application, at least for the present time and with current techniques.

Once the decision to use microwaves is reached, pulse modulation becomes a logical method of transmitting the intelligence since it offers several advantages over other types of modulation. One of the most important of these is the ease with which it can be applied to time-division multiplexing (to be described in more detail below) to allow simultaneous transmission of a large number of channels. Another is improvement in signal-to-noise ratio that can be obtained as a result of the wide band transmission. A further advantage is that pulse modulation allows the use of very simple circuits which makes the eqipment easy to manufacture, operate, maintain and service. Pulse modulation also simplifies the design of the repeater amplifier since no matter what distortion is produced in the amplifier only a minimum of cross talk or distortion of the modulating signal can take place if a sufficient bandwidth is provided.

The requirement that the radio link be capable of transmitting many channels simultaneously has been referred to earlier in this article. Simultaneous transmission of more than one channel may be accomplished in one of two ways. One system, known as the frequency-division method, identifies each channel with a sub-carrier frequency. For example, a four-channel frequency division system many have sub-carrier frequencies of 10, 20, 30 and 40 kc. Each audio circuit modulates the sub-carrier identified with its channel.

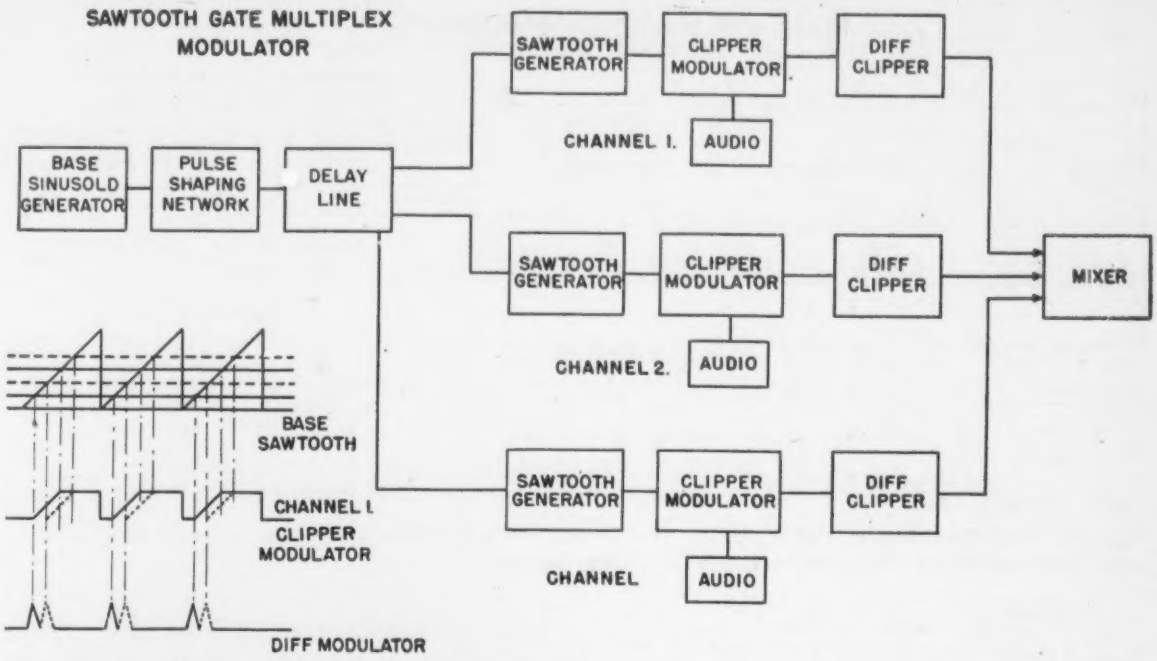


Fig. 5—Sawtooth gate multiplex vibrator. Pulse timing is obtained by taps on delay line.

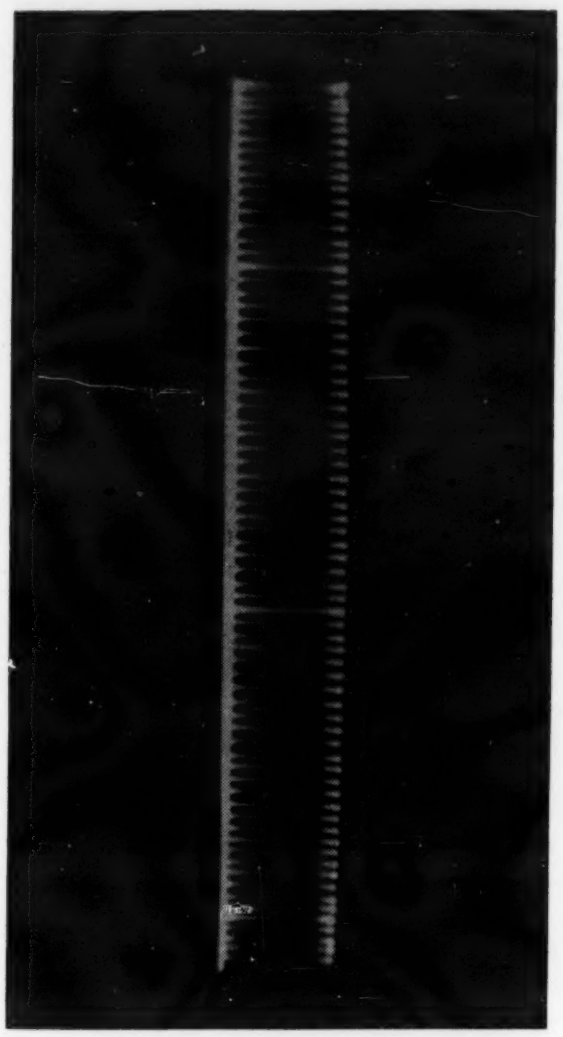


Fig. 4 — Oscillograph of 24-channel pulse series, showing 2 full cycles. Brighter pulse is marker.

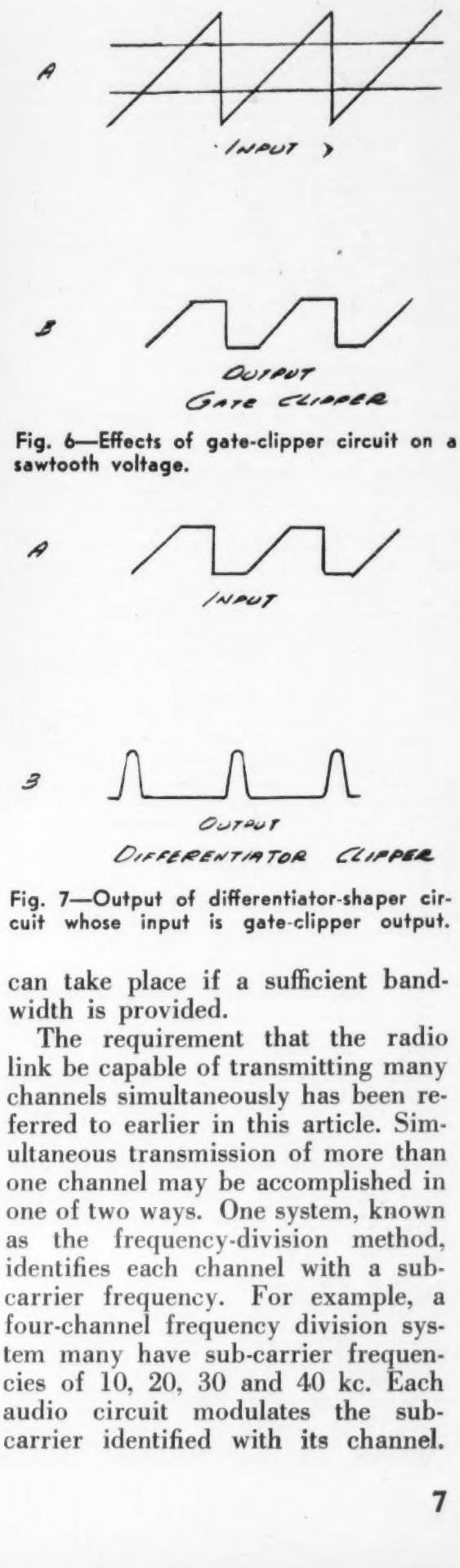


Fig. 6—Effects of gate-clipper circuit on a sawtooth voltage.

Fig. 7—Output of differentiator-shaper circuit whose input is gate-clipper output.

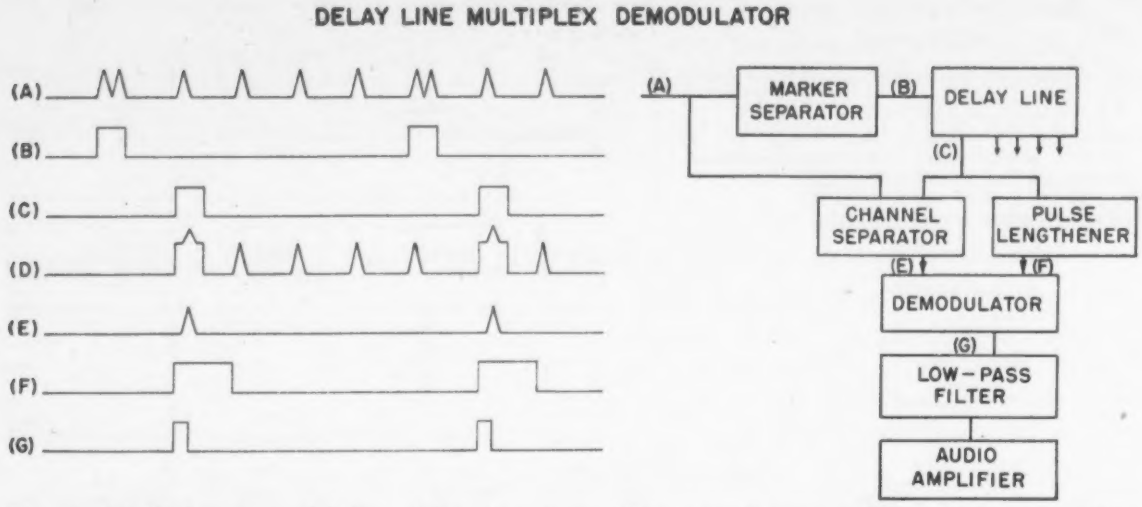


Fig. 8—Multiplex demodulator, delay line type. This circuit accomplishes both separation and demodulation of time-modulated pulse series.

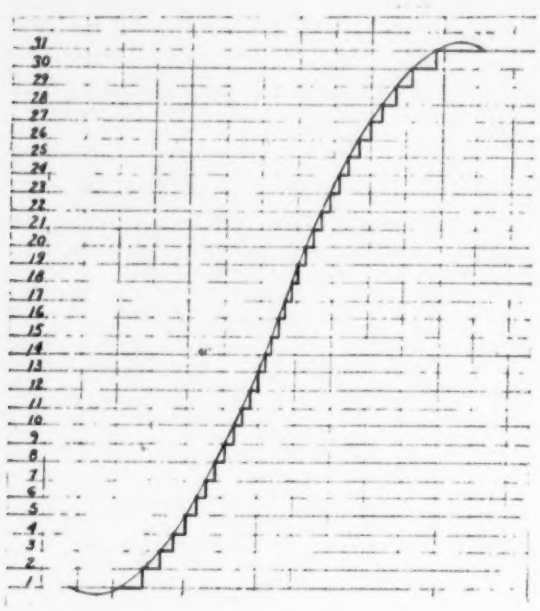


Fig. 9—Division of signal amplitude into 31 discreet levels.

LEVEL NUMBER	WEIGHT OF PULSE 1	2	4	8	16
1	X				
2		X			
3	X	X			
4			X		
5	X		X		
6		X	X		
7	X	X	X		
8				X	
9	X			X	
10		X		X	
11	X	X		X	
12			X	X	
13	X		X	X	
14		X	X	X	
15	X	X	X	X	
16					X
17	X				X
18		X			X
19	X	X			X
20			X		X
21	X		X		X
22		X	X		X
23	X	X	X		X
24				X	X
25	X			X	X
26		X		X	X
27	X	X		X	X
28			X	X	X
29	X		X	X	X
30		X	X	X	X
31	X	X	X	X	X

Fig. 10 — Binary counting system showing combinations for any number to 31.

The modulated sub-carriers are then used to modulate the RF carrier. At the receiver, these channels are then separated by frequency selection and the sub-carrier filtered out, restoring the original audio signal. A serious problem in this system is cross-modulation introduced by a distortion.

The second system of multiplexing is known as time-division multiplexing. In this case, samples of each channel are transmitted in time sequence. That is, the instantaneous amplitude of the first channel signal is recorded and transmitted. Then, the instantaneous amplitude of the second channel signal is recorded and transmitted, and so on for each channel. When all the chanels are sampled, the process is repeated. In Federal's 24-channel equipment the repetition rate is 8,000 times per second. This rate, of course, far exceeds that required to prevent the listener from detecting any perceptible difference between what he hears and continous sound. It is an effect similar to that which the eye receives when viewing motion pictures. Pulse modulation is particularly suitable for time division multiplexing since one of its inherent characteristics is that but one increment of the signal is transmitted at any one instant.

The reasons for operating the radio link at microwave frequencies, using pulse modulation and time-division multiplexing having been shown, the next point to be determined is what type of pulse modulation shall be used. Many methods of pulse modulating an RF carrier have been proposed in the past several years. Included among these are: PAM, in which the pulse frequency is the variable; PTM, wherein the time between pulses is the form of modulation; and PCM, where a coded type of modulation is used. These different types of pulse modulation are shown graphically in Fig. 1.

As may be expected, each of these systems has its advantages and disadvantages. Pulse time modulation, which was used in the ETO equipment and is used in the 24-channel telephone link developed by Federal Telecommunications Laboratories research unit of International Telephone and Telegraph Corporation, and pulse code modulation, are two of the most promising methods.

Pulse Time Modulation

THIS MODULATION can best be understood by reference to Figs. 2 and 3. Fig. 2 shows a one- channel system , with two sets of pulses. One set is known as the marker pulse and the time spacing between succeeding pulses of this set is always the same. The function of these pulses is to synchronize the demodulator located in the receiver with the modulator located in the transmitter. The other set of pulses shown in Fig. 2 carry the intelligence. Here the time spacing between succeeding pulses varies in accordance with the modulation. Each pulse samples the modulating signal and takes up a position in time determined by the instantaneous amplitude of the sample of modulated signal. The pulse displacement from the mean position is shown on the figure by the successive increments D_1, D_2, D_3, and D_4, at the scanning times t_1, t_2, t_3, and t_4, repectively.

It is apparent that the repetition rate of the pulses must be sufficiently high to reproduce the modulated signal at the receiver within a certain minimum distortion level. The pulse repetition rate required to do this is a function of the highest modulating frequency, the maximum pulse displacement and the maximum allowable spurious distortion. For the particular modulation displacement used in the 24-channel equipment, the ratio of pulse repetition rate to maximum modulation frequency is 2.5:1, resulting in distortion, from this cause alone, of less than 1%.

It should be noted that the modulation displacement D is only a fraction of the total period T. During the remaining interval of time, pulse series carrying modulation for other channels can be interleaved as illustrated by Fig. 3. A single series of marker pulses are used as the reference for all channels. Generally the marker pulses are given a distinguishing separation or width characteristic as indicated in this figure, to facilitate their removal. Fig. 4 shows an oscillograph of 24 sets of interleaved channel pulses. The brighter pulses are the markers and are made up of two pulses, side by side, each similar to a channel pulse.

By limiting the maximum swing of modulation displacement, each channel is made independent of all others. Likewise, by providing the proper frequency band, carry over between adjacent pulses is avoided, and thus

cross-talk between channels is minimized.

The following steps are involved in the generation of a pulse-time-modulated mutliplex wave form:

a. Generation of a series of pulses;
b. Production of pulses at proper time intervals to provide a series for each channel;
c. Modulation of each series of channel pulses by the respective audio-frequency signal;
d. Limitation of the audio-frequency modulating signal—to prevent cross-talk or "breakthrough" between channels;
e. Generation of a marker pulse; and
f. Final mixing of channel and marker pulses into one interleaved set.

The one used in the 24-channel equipment is called the saw-tooth gate modulator and a functional diagram of this system is shown in Fig. 5. Before the operation of this circuit can be understood, however, a brief review of two fundamental circuits is necessary.

They are the gate clipper and differentiator shaper circuits. Fig. 6 shows the effect of a gate clipper circuit on a saw-tooth wave. This circuit does not allow the signal to exceed a certain maximum value, denoted by line 1 on Fig. 6 (a) or to go below a certain minimum value, denoted by line 2. As a result, the output is of the form indicated by Fig. 6 (b). The differentiator-shaper transfoms the signal in a manner shown in Fig. 7.

Returning now to the sawtooth gate modulator, the fundamental timing is obtained from a sinusoidal oscillator, operating at a base frequency of 8 kc. The sinusoids are transformed into pulses by appropriate shaper circuits. These pulses are then fed into a delay line which is tapped at 24 points and yields a set of pulses delayed in time by the average channel spacing of 5 microseconds. Before applying these pulses to the modulation they are shaped into a sawtooth waveform by simple RC networks.

Fig. 5 shows the sequence of events in channel 1. A gate clipper circuit transforms the sawtooth wave into the form shown on the figure marked channel 1. Here the solid and dotted lines indicate two different modulating signal conditions. The audio modulation raises or lowers the gate lines in accordance with its modulation. It is evident from the figure that lowering or raising the gate lines varies the time at which the wave form starts. The

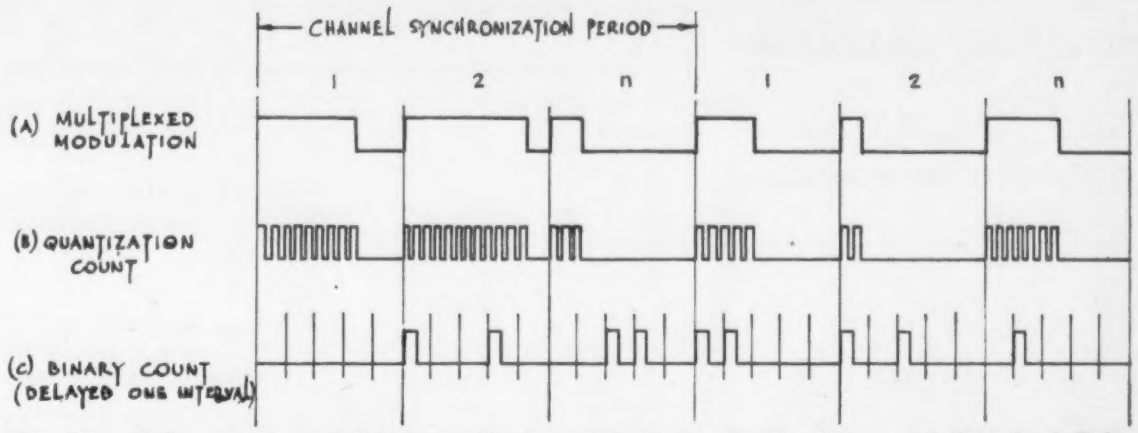


Fig. 11 — Pulse count modulation method proposed by A. H. Reeves of Standard Telecommunication Lab. Note that formation of pulse code is delayed one channel time interval.

output of the gate clipper is fed to a differentiator-shaper. This circuit produces a pulse wherever the wave form changes its amplitude in the positive direction. The time position of this pulse is a function of the modulation amplitude.

The same procedure is followed in each of the channels. The time at which the pulse is produced, in each case, is dependent upon the delay line tap for correct channel position and the audio modulation for variation within the time displacement period. The output of each differentiator-shaper is fed into a mixer whose output is then a series of time-modulated pulses. The first pulse in the series is the marker. In this manner the wave form shown in Fig. 4 is obtained.

Demodulation

THE SEQUENCE of operations necessary to retranslate the time-modulated multiplex series into individual audio-frequency channels after reception of the radio signals, generally involves the following:

a. Removal of marker pulse from series;
b. Separation of the individual channel pulses from the combined pulse series;
c. Retranslation of the individual channel time-modulated pulse series into appropriate audio-frequency signal;
d. Amplification of the audio-frequency signal.

As in the case of the modulation process there are many possible means of accomplishing the demodulation of the time-modulated pulse series. An operational block diagram of the delay line demodulator used in Federal's 24-channel equipment is shown in Fig. 8.

As indicated on this figure the marker pulse is first separated from the time-modulated series of pulses by means of a marker separator. The output of this separator, shown by (b) on this figure, is fed to a time-delay line which is tapped at 24

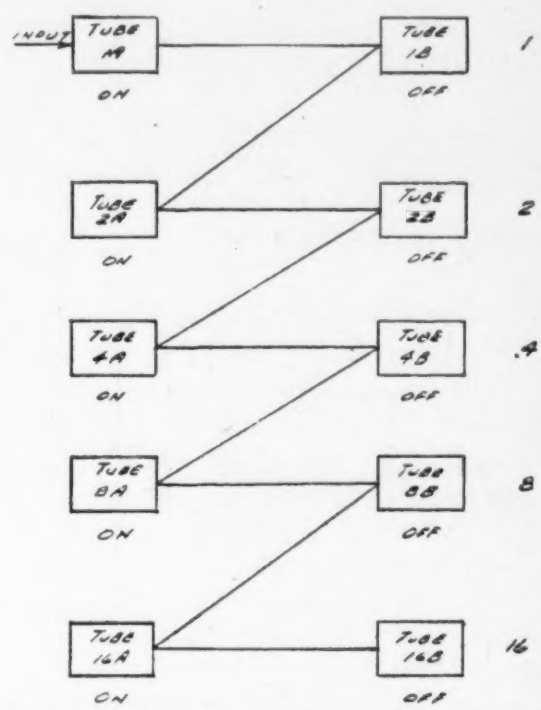


Fig. 12 — Binary counting circuit is series of "flip-flop" multivibrators.

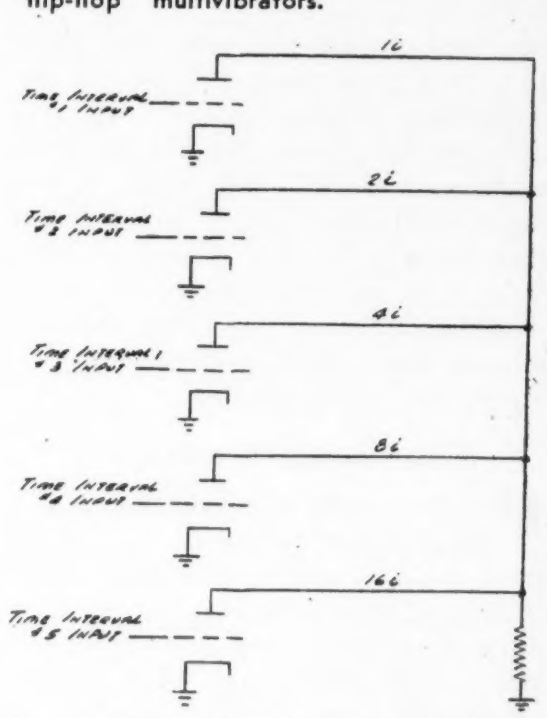


Fig. 13—Simplified schematic of 5-tube demodulator circuit.

points in a manner identical to the delay-line action used for modulation. The output of the first tap (c), consists of a series of pulses appearing, in each case, in the first time channel. This is combined with the original pulse series in a channel separator and causes the first channel pulse to be "stepped" up above all other pulses as shown by (d). A

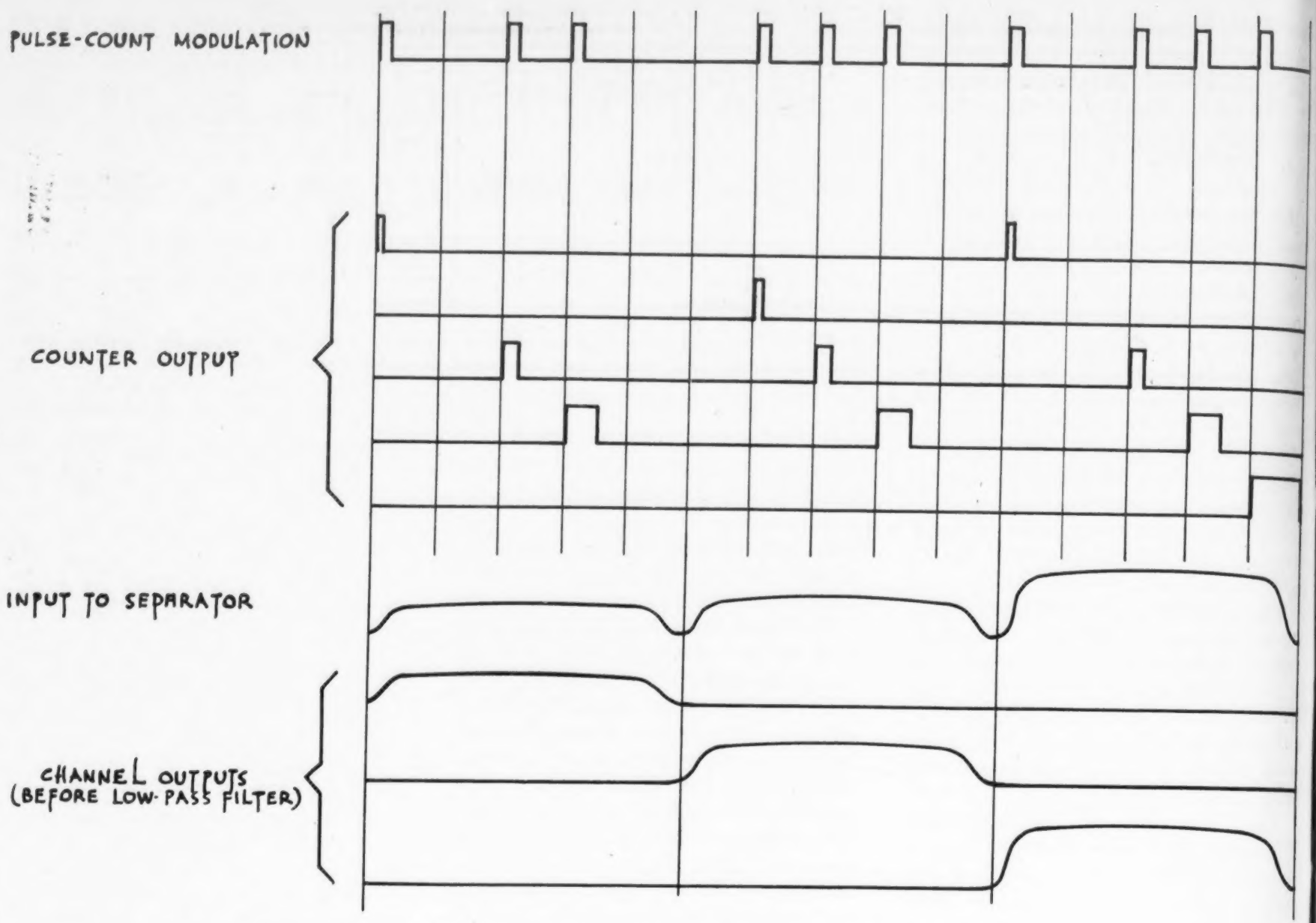


Fig. 14—Wave-forms of three-channel pulse count modulation system at demodulator.

clipping circuit removes this pulse (3), which is then fed to the demodulator. The output of the delay line tap is passed through a pulse lengthener circuit, and is also fed to the demodulator (f). This pulse is then "cut" by the time-modulated pulse (g), giving a series of width-modulated pulses. A fileter then removes the pulse component and yields the audio signal.

Pulse Count Modulation

PULSE COUNT modulation, sometimes called pulse code modulation, is a recently developed pulse technique that promises unique freedom from noise and interference in radio link relays. In this system, originated by A. H. Reeves of I.T.&T's British associate, Standard Telecommunication Laboratories, intelligence is transmitted by mean of a coded pulse series, in a manner similar to the operation of the printing telegraph.

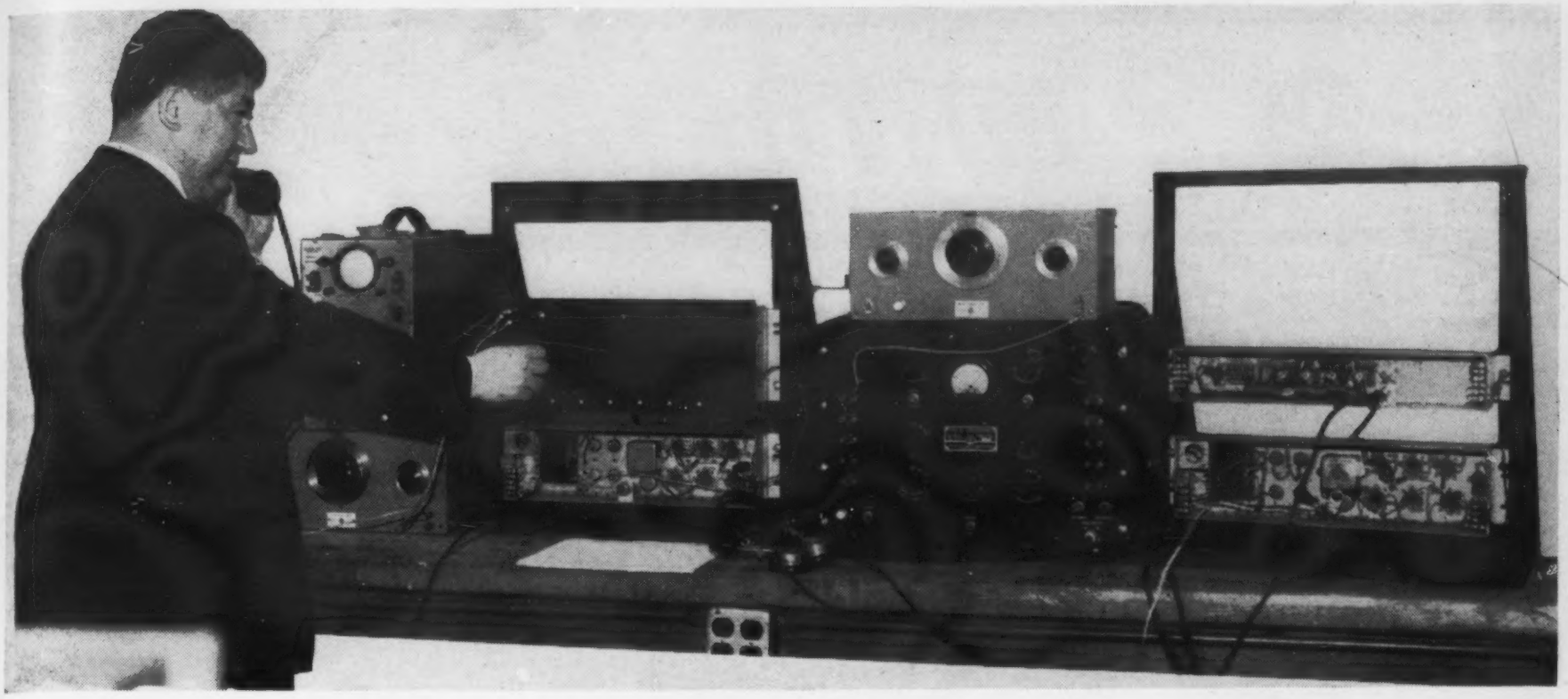
Consider the action of the printing telegraph: Assume the operator presses the "A" key. This causes the transmission of a coded signal, say two pulses, two blanks, and one pulse. When the receiver detects this coded signal, the key "A" is pressed and typewritten on a sheet of paper. Since the receiver has reproduced the original signal exactly, this represents a completely noise-free and distortionless system. The only way noise can manifest itself is when it is sufficiently large to change a blank to a pulse or vice versa. Once a mininmum input signal-to-noise ratio is exceeded, however, an infinite signal-to-noise output will result.

Pulse count modulation uses a similar system. The audio amplitude is converted into a coded pulse series. This code is picked up at the receiver and an amplitude equal to the original modulating amplitude is reproduced. It is readily seen that, just as in the printing telegraph, if there were a special code for every possible amplitude and an input signal-to-noise that exceeded the required minimum, a virtually noise-free, distortionless system would be evolved.

Unfortunately, an infinite number of coded signals would be required to cover every possible amplitude. Since this is impossible, the other alternative is to provide a finite number of levels and code each one. Fig 9 shows a 31-level division. In this case the modulating amplitude would be identified with the level into which it falls, and the signal reproduced at the receiver would correspond to the mean value of that level. This introduces some distortion into the system—3.5 per cent for the 31-levels—which decreases as the number of levels is increased.

A simple coding system would be to send out one pulse for level Number 1, two pulses for level Number 2, etc. However, this would mean that as many as 31 pulses would have to be transmitted within one channel. This is obviously excessive. A somewhat simpler system would be the decimal method, whereby there would be two separate time intervals. The first would represent tens, the second units. Thus, if the number 26 is to be transmitted, two pulses would be generated in the first interval and 6 pulses in the second time interval. Here as many as 9 pulses would have to be transmitted within one time interval which, again, is excessive.

From an electronic standpoint, a satisfactory counting method is the binary system. In this method 5 time intervals are required to count to 31. The first interval represents 1, the second 2, the third 4, the fourth 8, and the fifth 16. Each interval can



Federal engineer testing expeirmental model of pulse count modulation equipment.

either be a blank or a pulse. The intervals that have pulses are added to obtain the total number. For example, the Number 3 would be represented by a pulse in the first and second intervals; the Number 11 by a pulse in the first, second, and fourth intervals; the Number 21 by a pulse in the first, third, and fifth; and so for any number up to 31. Fig. 10 shows the required combination for any number. The advantage of this system is that all the receiver has to detect in each interval is the presence or absence of a pulse. The similarity between this code and that of the printing telegraph is apparent.

PCM Methods

SEVERAL METHODS are available for producing pulse count modulation and for its demodulation. The method to be described in this article is the one proposed by A. H. Reeves. The modulating signal is first transformed into pulses whose width is proportional to their amplitude as shown in Fig. 11 (a). This pulse-width modulated signal is fed to one grid of an amplifier which is biased so that it is cut off in the absence of the pulse. An oscillator feeds another grid of this amplifier. The presence of the pulse allows the tube to conduct and amplify the sinusoidal wave. The number of cycles that will be amplified will be proportional to the length of time the pulse is impressed across the grid. A pulse-shaping and quantitizer circuit then converts the sinusoidal wave into a series of pulses, as shown by (b) in Fig. 11, whose number is proportional to the amplitude of the modulating signal and equal to the nearest of the 31 discreet levels.

This signal is fed to a binary counter which is a series of "flip-flop" multivibrators shown in Fig. 12. As indicated on this figure, there are five pairs of multivibrators. In the stand-by condition, all the tubes on the left are on (a), while the tubes on the right (b) are off. When a pulse is fed to the input, it turns 1 (a) off and 1 (b) on. The next pulse turns tube 1 (a) on again and 1 (b) off. When 1 (b) goes off, however, it sends a pulse to 2 (a) which in turn goes off and turns 2 (b) on. Whenever a tube that is off receives a pulse, it is turned on. Whenever a tube that is on receives a pulse, it is turned off and sends a pulse to the next tube. Thus, it is seen that the third pulse will turn 1 (a) off and 1 (b) on. To determine the total number of pulses fed to the input of the counter, merely add the number of (b) tubes on. Thus if 16 (b), 4 (b) and 2 (b) were on, the count would be 22. These five tubes correspond to the five time intervals referred to previously, and a ring circuit examines each (b) tube after the count has been made and sends out a pulse for each tube that is on in the proper sequence.

Typical PTM repeater used in experimental 24-channel microwave radio link developed by Federal Telecommunication Labs.

The demodulator consists of five tubes, the outputs of which are all connected across a common resistor as shown in Fig. 13. Each tube is biased to cut-off, but will conduct when a pulse is impressed across its grid. The output of each tube varies. If the minimum output is called i, then the outputs of the tubes will be i, 2i, 4i, 8i, and 16i, respectively. The input signal is separated so that the first time interval output is impressed across i, the second across 2i, the third across 4i, etc. Those intervals that have pulses will allow the tubes associated with them to conduct (Fig. 14). The voltage across the common resistor will be determined by the coded number and thus be equal to the mean value of the modulating signal level.

Tests of pulse - count - modulation have confirmed the advantages theoretically indicated. In particular, the characteristics of the system have permitted operation over relatively unfavorable transmission paths where severe fades, as well as multipath reflections, are expected.

On the basis of experimental results obtained to date, pulse-count modulation seems to offer particularly attractive possibilities for multichannel operation over long relay paths. With the many advantages being offered by PTM and PCM, it seems evident that microwave radio link systems are destined to play an important part in both military and civilian telephone circuits of the future.

EDITORIAL

Brig. Gen. David Sarnoff served with the Signal Corps both in the U. S. and overseas during World War II; he was awarded the Legion of Merit and the Medal for Merit for outstanding civilian service. General Sarnoff is President and Chairman of the Board, Radio Corporation of America; and Chairman of the Board, National Broadcasting Company.

FREEDOM TO LISTEN AND FREEDOM TO LOOK

"Freedom to Listen and Freedom to Look"—for all peoples of the world—is not a new idea that has come up overnight; it has been with us ever since short waves began to encircle the globe more than twenty years ago.

It is apparent that to serve its purpose, "Freedom to Listen" must encompass more than a naked principle set adrift in stormy weather. It must be sheltered by necessary facilities, clothed with decent appropriations, and nourished with suitable programs. To bring these factors into harmonious operation is a large undertaking, and I realize that many political, technical, and financial problems are involved. But I am confident that through international cooperation and statesmanship, these problems can be solved.

If the principle is right, and if the job needs to be done, it is clear, it seems to me, that the cost is relatively unimportant. Even if the cost of operating a world-wide broadcasting system should prove to be as much as fifty million dollars a year, that figure is far less than the cost of one modern battleship; it is a mere fraction of what a single nation spends yearly for its armament. It is less than one-fifth the amount that was spent on fighting in a single day during the last World War.

Since the fighting war ended two years ago, another global conflict has started—a battle for the minds of men. Forces of totalitarianism and aggression still are attempting to mislead the masses. Fully aware of the power of radio, they are using it to spread propaganda that runs contrary to peace, freedom, and democracy.

Our American concept of radio is that it is of the people and for the people. Its essence is freedom—liberty of thought and of speech. Our purpose in fostering international broadcasting is to help make the spectrum of radio truly a spectrum of peace.

By its very nature, radio is a medium of mass communication; it is a carrier of intelligence. It delivers ideas with an impact that is powerful. In the preservation of peace, the electron, which is the heartbeat of radio, may prove more powerful than the atom. In a forum for international discussion and education, the voice of radio can carry knowledge of public issues around the earth and mold public opinion far more quickly and far more effectively than any other means.

In recent months you have doubtless seen and read much about the progress of television. It is on the way and moving steadily forward. Television fires the imagination, and I can foresee the day when we shall look around the earth from city to city, and nation to nation, as easily as we now listen to global broadcasts. Therefore, "Freedom to Look" is as important as "Freedom to Listen," for the combination of these will be the radio of the future. This is no idle dream and no one need doubt that we shall have international television.

In our lifetime we have witnessed the evolution of international radio in its various forms of service; we have seen the manually operated telegraph key give way to high-speed automatic printers. Today, science makes it possible for radio to serve all parts of the world instantly and simultaneously. Therein lies the greater responsibility for the leaders of all nations, to encourage its proper use and to serve the peoples of the world whose yearning is for peace.

President, Army Signal Association

WINSTON THE DRAMATIC
Britain's wartime Prime Minister, wearing Russian black fur cap, enters Livadia Palace for Yalta Conference.

STRATEGY IN THE CRIMEA
Pres. Roosevelt meets with his staff: Secy. of State Stettinius, Adm. King, Gen. Marshall, Ambassador Harriman, and Adm. Leahy.

155mm HELL

983rd Field Artillery fires on Japs on Leyte. Enemy mobile equipment was blasted by direct hits from this battery. 1944.

CAROL AT TACLOBAN

Personnel of Photographic Section, GHQ Sig. Sec., and Filipino guests celebrate Christmas, 1944.

CHATEAU FRONTENAC

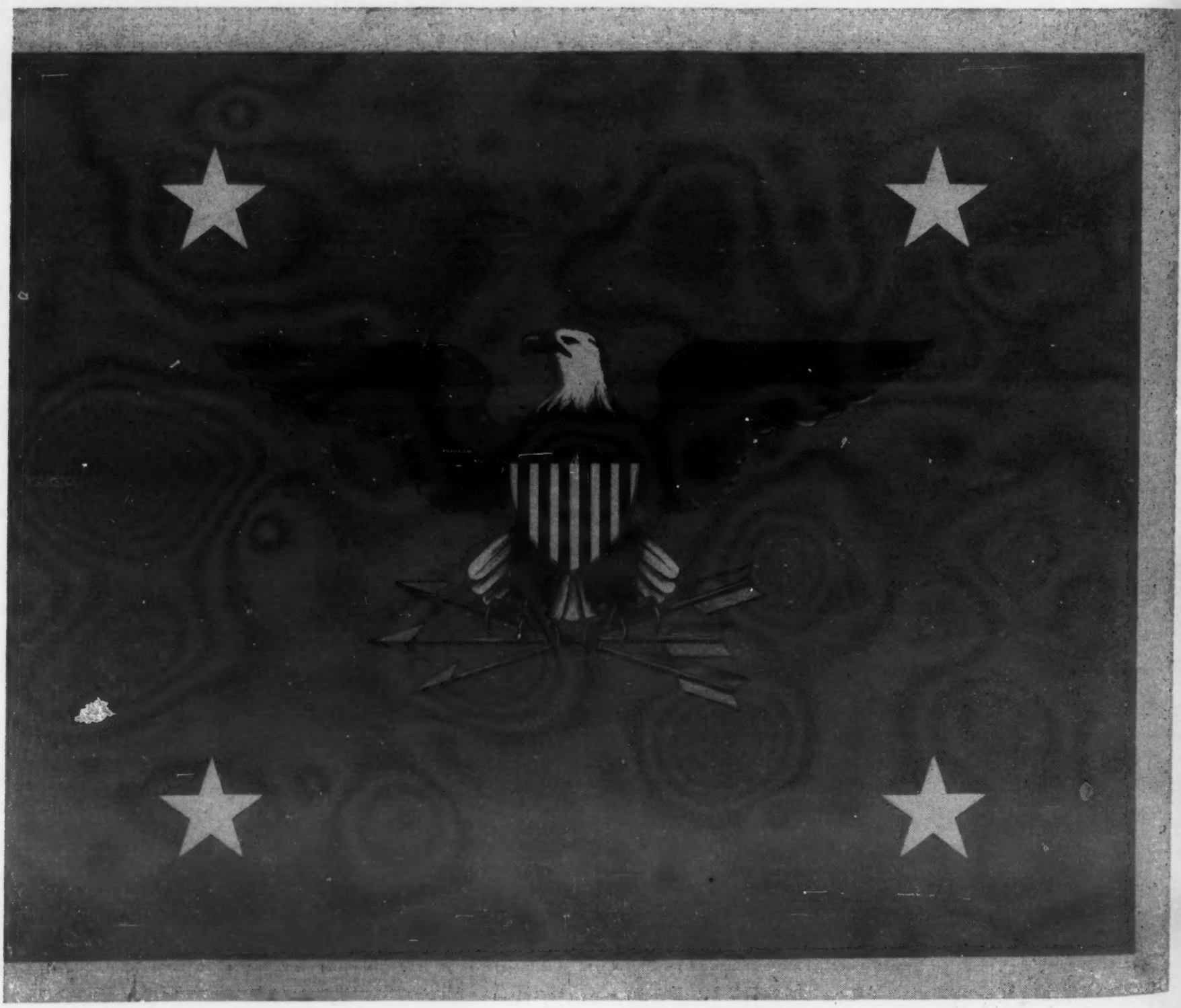
This picturesque hotel in Quebec was the scene of important Allied conferences in 1943.

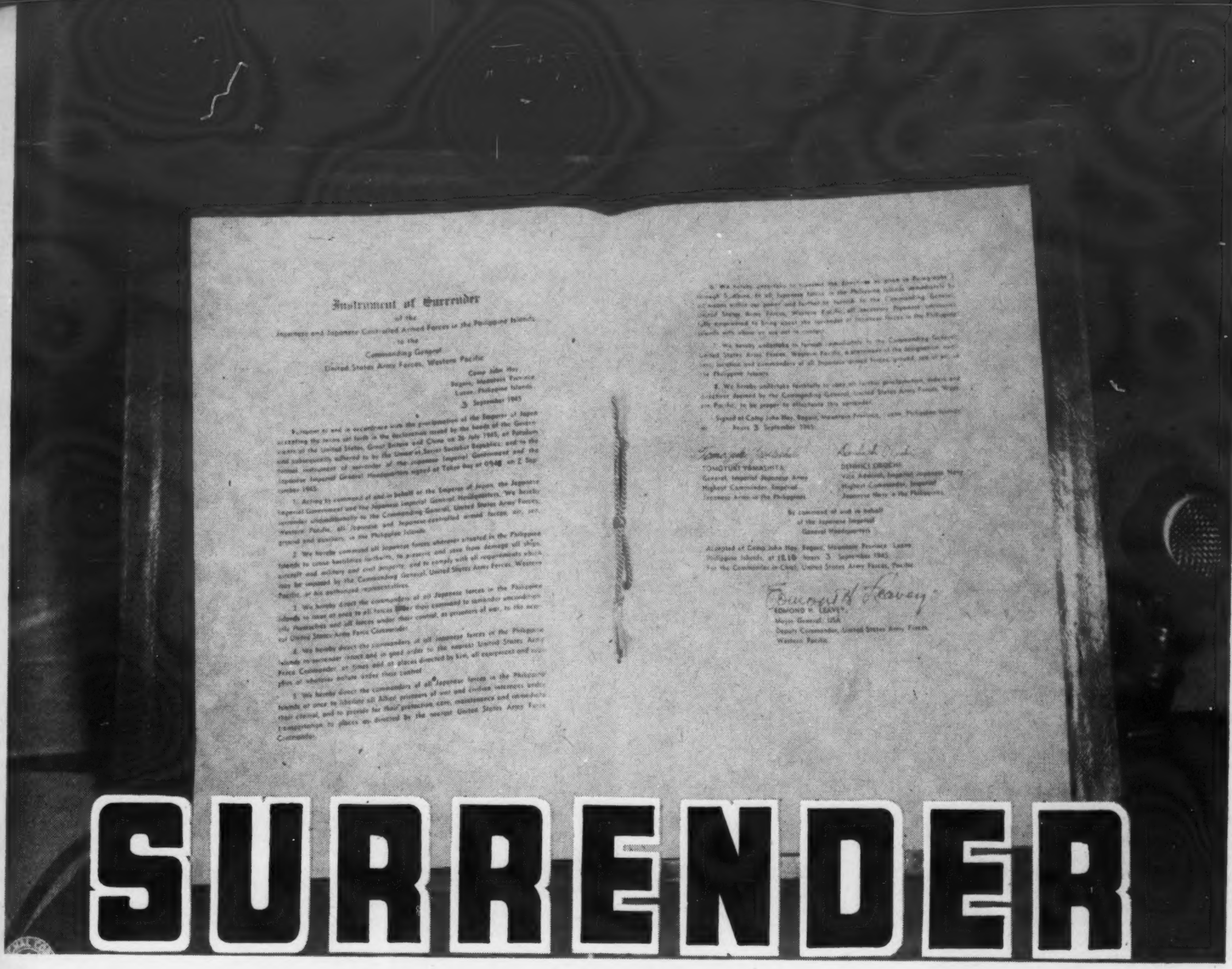
WATER-BORNE SIGNALS

PCE-848 played a heroic part in the Philippine operations. Signal ship is shown in Humboldt Bay, Hollandia, Dutch New Guinea.

NATIONAL DEFENSE

On 7 October 1947, President Harry S. Truman formally approved the Official Seal of the National Military Establishment (above), and the Official Flag of the Secretary of Defense (below), as provided in the National Security Act of 1947.





SURRENDER in the PHILIPPINES

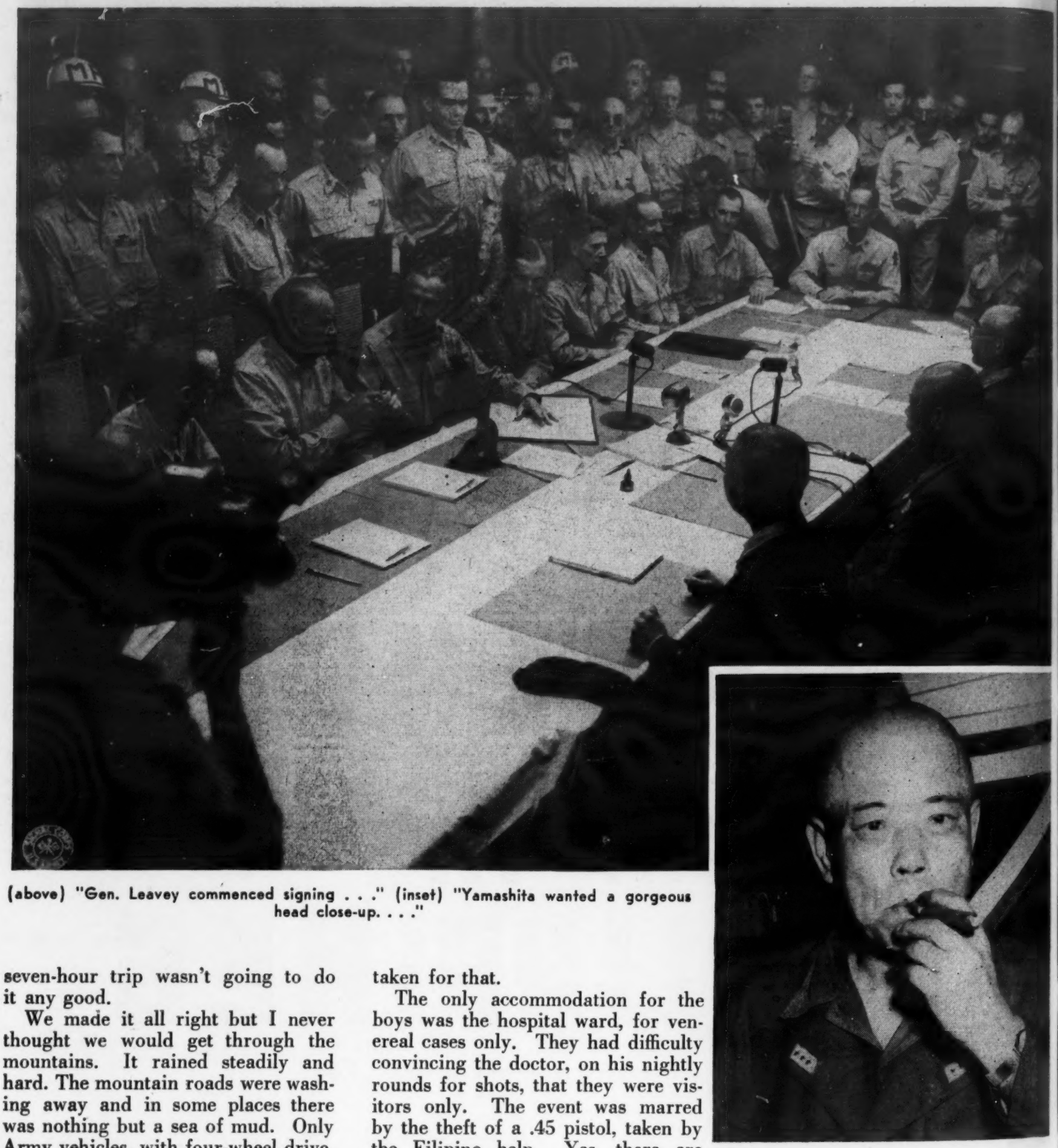
By Lt. Harry S. Franklin, S.C. Res

When General Tomoyuki Yamashita signified his willingness to surrender the Japanese forces in the Philippines, I was given the assignment of making the newsreel and still picture coverage of the event. It was quite a burden; as a Signal Corps newsreel officer, my work had been for the most part plain combat photography. The war's end gave promise of more interesting things to shoot—and here they were.

As my team of six GIs would provide the only motion picture coverage for the world, I wasn't taking any chances. It was one of the most important news breaks of the war—the Tiger of Malay brought to bay. From the 16th Signal Battalion, I borrowed two brand new generators, each capable of 150 amps, and their best power man to run them. I got their best electrician and even took one of their radio repairmen, just in case our sound system gave trouble—and it did. I borrowed hundreds of feet of cable, light cord, sockets and miscellaneous tools and equipment.

We left for Baguio on Saturday, September 1, two days prior to the signing and made quite an imposing little convoy: two jeeps, two weapons carriers and the two generators mounted on trailers. There were just enough seats for the nine enlisted men and myself. The sound equipment was carried on our laps and that

Signal Corps cameramen provided motion picture coverage for one of the Pacific War's most historic events



(above) "Gen. Leavey commenced signing . . ." (inset) "Yamashita wanted a gorgeous head close-up. . . ."

seven-hour trip wasn't going to do it any good.

We made it all right but I never thought we would get through the mountains. It rained steadily and hard. The mountain roads were washing away and in some places there was nothing but a sea of mud. Only Army vehicles, with four-wheel drive, made the trip that day; the next day the road was closed in. Very few correspondents got through and the Engineers worked mightily with bulldozers and gangs of men in order to make the road passable for Generals Wainwright and Yamashita.

Baguio

WE ARRIVED about 8 o'clock Saturday night, cold, wet and hungry. That wonderful Mess Sergeant ! ! He actually made steaks for us, with his own unsoiled hands. In four long Army years, it was the first time I had seen a Mess Sergeant touch a utensil. He got his picture taken for that.

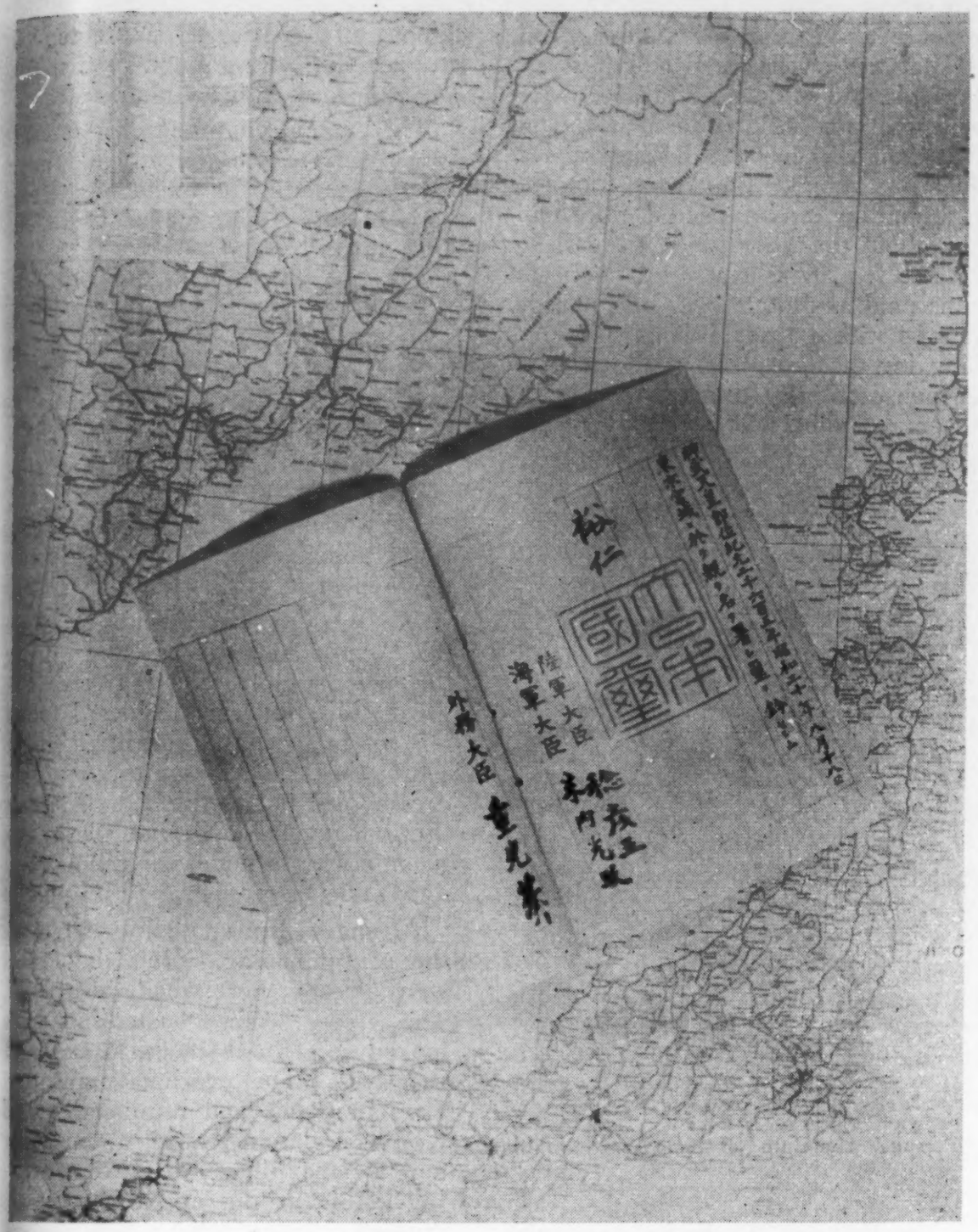
The only accommodation for the boys was the hospital ward, for venereal cases only. They had difficulty convincing the doctor, on his nightly rounds for shots, that they were visitors only. The event was marred by the theft of a .45 pistol, taken by the Filipino help. Yes, there are Filipinos that steal. . . .

Baguio was cold, and we revelled in it. After the 135° heat in New Guinea and the ennervating climate of the Philippines, the mountains were like a cold, comfortable blanket.

Sunday we drove over to the United States High Commissioner's home, where the ceremonies were to be held, and set up. Out of the ruins of Baguio, it was one of the very few buildings that was barely touched. It was a beautiful place with an enormous room furnished with two long, shiny tables where Yamashita was to sign the surrender documents.

We made a fine job of stringing overhead photo-floods; placed our generators nicely so they wouldn't be heard; ran all our cables; and set up our cameras and sound equipment. The big Wall camera dominated the entire room from its corner. Two 400′ magazine load Bell & Howell eyemos were set up in other corners. We could photograph every inch of the room without picking up any other camera.

Colonel Bishop, who attended the conference and wrote the script, gave us carte blanche. We had to know the seating arrangement, the dialogue, the times of arrival, etc., and a re-



Bearing personal signature of Emperor Hirohito, these are credentials delivered by Jap delegates.

hearsal was arranged for that night. But that evening the poor Colonel was in no condition to stage a rehearsal. So many Generals arrived that by 11 p.m. we were still sitting there, waiting. The boys had missed chow in order to photograph Yamashita's arrival at 6 p.m. Most of the correspondents could not get there; the roads were out. However, a few, such as Shelley Mydans, Adams of CBS, a representative of Yank magazine and a few others did make it. An Australian newsreel cameraman arrived with a 100′ load eyemo. How he was going to get enough photographed to make sense, even if he did load twice, was beyond us. However, he had come a long, rough way and I showed him a spot where he could set up without getting into our camera range. He did break into one scene when he moved his camera, in spite of the warning he had received.

The correspondents were wet and hungry and tired. We were just hungry. About midnight the good Colonel had horrible sandwiches and coffee brought in. Spam, I believe, the good old Army standby. The news gentry munched as they drearily typed out God knows what: the rain and the roads and what hardships they underwent to get there, I guess.

Bedlam

TOGETHER with us were the correspondents, the MP's, the radio announcers, foreign cameramen, interpreters, and the place was a bedlam. I'm sure poor Yamashita didn't sleep a wink. Two radio vans were dragged up; three teletype machines were installed and in no time were operating like mad; switchboards, carrier equipment, radio transmitters; I felt proud. In spite of all our beefing and twitching our Army, in one day, had assembled all this highly technical equipment and was in complete operation in a matter of hours.

At six p.m. Yamashita arrived. Major "Ribbons" (Major Kenworthy, MP officer in charge, who wore row after row of ribbons and was quickly dubbed by the boys) went scurrying about, straightening his men and snapping orders. Generals popped out of doors, cameramen ran to their posts, and by the time Yamashita, riding in a jeep, pulled into the driveway, there was quite a reception committee.

A lieutenant was frisking each Jap and noticed a lump in the pocket of one of Yamashita's bodyguards. He called Colonel Bishop and they simultaneously shoved their hands into the pocket. The Colonel came out with a hand grenade, a live one. The Colonel was mad. "The nice little Japs; coming to the surrender conference with hand grenades in their pockets." The Colonel was madder. "Grab them all and search them, even if you have to take off their clothes!"

Even Yamashita was duly searched. One Jap had three new Hamilton ladies' wrist watches that were grabbed somewhere in the islands, probably at Manila. The two Jap Admirals had big stacks of new Filipino 50-peso notes and oddly, the Generals were broke. The boys whimsically deduced that there must have been a big Army-Navy crap game the night before, with the Navy the winner.

I was in the brilliantly lighted hallway, waiting with my little eyemo. From my position, looking out at the archway, I saw jeep after jeep of

Harry S. Franklin is a graduate of Toronto University; worked as production manager and assistant director in Hollywood before war. Drafted in March 1942, he was assigned to Signal Corps Training Film Laboratory, where for 18 months he wrote, directed and operated camera on various training films.

Sent to New Guinea in 1944, he attended Officer Candidate School in Brisbane, Australia. Following graduation, assigned to newsreel unit in Philippines, covering 11th Airborne Division at Batangas, Luzon. Landed with Gen. Kreuger's Sixth Army at Waukayma Beach, Japan, September 1945.

After discharge in February 1946, assistant director on "Arch of Triumph" for Enterprise Studios in Hollywood; also assistant director on "The Web" for Universal, and a number of westerns for Eagle-Lion.

Japs pull away. The lesser lights were whisked off to the heavily guarded tents.

Yamashita Arrives

THEN CAME the bigs guns, escorted by our General. Timoyuki Yamashita — commander of all Jap forces in the Philippines, conqueror of Singapore—General Muto, Admiral Okochi, and Vice Admiral Arima. I knelt on one knee and my eyemo went into action. It sounded like a coffee grinder and Yamashita stopped cold on the first step and took a good look. I nearly dropped the camera when he motioned me to come closer. He knew his camera and wanted a gorgeous head close-up. He took another step and turned and began motioning and jabbering. By that time I had changed angles and somebody beside me said he was calling for his interpreter. After a few seconds a dusty Jap was ushered in with Yamashita and then the two of them trudged upstairs.

The swords were all collected and neatly tagged and placed on a table in a room adjoining the conference chamber. An MP was on guard duty night and day. Major Ribbons went in to inspect them every few minutes. He was forever looking at those swords.

I ran outside and made a few scenes of all the rank congregated at the archway and then suddenly had an idea. But the boys were ahead of me. I bounded upstairs and there was one of my men poking a suitcase light, complete with stand and a number 6 photofleet, into Yamashita's bedroom. How he ever ran a line up there so quickly, I'll never know. The two still cameramen were banging away with their Speed Graphics. I stepped into the room, backed against the wall and began churning with the eyemo. Yamashita was seated in a large Morris chair, before a small, round, flat-topped bare table, smoking a cigarette and jabbering genially to his interpreter who was seated at his right. The interpreter turned and said the General would like an ashtray. Somebody in the doorway yelled, "Use the floor!"

In came a Colonel with a pile of swords that had been taken away from the Japs. He handed Yamashita his sword and said to the interpreter, "Tell the General we want a picture of him relinquishing his sword."

They jabbered a second and Yamashita, in apparent fun, took his sword, hesitated a second, and then placed it on the pile in the Colonel's arms. We banged away. The Colonel beamed, shook his head, said, "That was swell!" and stomped out.

I glanced at Yamashita's feet. His left foot was resting on his toe and his booted heel was beating a fast nervous tempo. But he was congenial, smiling, and appeared quite happy about the whole thing. Again he asked for an ashtray and again no one paid any attention. By this time I was within three feet of him, trying for that gorgeous head close-up, which is a silly thing to try as no eyemo can be held steadily enough,

Personal signature of Emperor Hirohito.

when through the finder I saw my power man, T/5 Lee, step into the scene, lay a piece of paper in front of Yamashita and hand him a pencil. I stopped and stared. The old boy smiled and picked up the pencil and signed his autograph as though he had been doing it all his life. Lee thanked him and stepped back. I gave Lee a dirty look for stepping into camera range when he knew better but actually, I admired his nerve. And Yamashita again jabbered to his interpreter and the latter turned and said, "The General wants an ashtray." I left. But I wondered if he ever got his ashtray.

Downstairs things had grown quieter. Outside there was one poor, tiny, miserable-looking Jap standing between two stalwart MP's, who were all resplendent in their uniforms. The contrast was terrific. Major Ribbons appeared beside me and said, "That little skunk had a live grenade on him!" and he showed me the weapon. I promptly photographed the little skunk, Major Ribbons, and the grenade.

An American captain came by. I knew he was an interpreter, born in Japan of missionary parents. I stopped him and pointed to the Jap. "Captain, ask him his name, please."

The captain complied and carefully wrote it down for me and gave me the paper. The name was "Ishiyana Motoji of Gumma-ka, Ora Gun, Nishiyana."

I sauntered back into The Room, beamed at the boys, compared notes and gave Lee hell. Nothing less than a two-star geenral, and myself, were allowed in the hallway after that. Nervous excitement ran high for a couple of hours and then simmered off. By midnight I said, "That's enough, boys; wrap it up. We're going. We wouldn't do justice to a rehearsal at this hour."

We were a weary troupe as we piled into our jeeps and drove through Baguio to our quarters. The wards were built on hillsides. I found my cot in the dark, staggered about setting up my mosquito net, undressed and fell on the bed. The last thing I remembered that night was tucking my .45 under the pillow. You didn't take chances in the Philippines.

A rehearsal was called for 8 o'clock the next morning. Half the crowd were already there when we arrived. The few women correspondents looked good in their skirts and neat uniforms. The previous night they were in slacks and reminded me of Kipling's classic remark about a rag and a bone. The others kept arriving in big groups and the noise increased.

Crisis In Sound

WE QUICKLY took the covers off our cameras and checked them. We were ready for the rehearsal. But alas, that damn rehearsal never did come off. We waited. I glanced at the sound man. He had his recorder on its side and was tinkering with it.

"Everything O.K., Oram?"

He shook his head sadly and my heart turned to stone. I went over quickly. "She won't work," he whispered. He and his assistants were checking the circuits with a meter. Colonel Bishop stepped up, looking fit and cheerful.

"Everything all right for you, Lieutenant?"

I managed a gulp. "Fine, Colonel," I said. When do we start?"

"General Wainwright should be here in 45 minutes and we'll start it five minutes later."

I lied like a trouper. "We'll be ready, sir!", and I turned to Oram. "You heard him. What's our chances?"

"Look!" and he held up a loose

wire, "That so and so just hooked this on; didn't bother to solder it."

"Get a line for the soldering iron, quick!" I said.

We had blown the house fuses the day before. All of us sprang to and in five minutes had our generators going and a line fed into the room. It was fast work. The boys knew their business. In 30 minutes they had that wire soldered, the recorder tuned and checked. And before the 45 minutes had passed, General Wainwright arrived. I grabbed my little coffee grinder and took my favorite post in the hall. The boys were just in time under the archway with their cameras. He came in fast, strode along the hallway, followed by two generals, turned right and entered the big room. And still the generals came. I thought I would run out of film before they had all arrived. We always photographed generals. You never knew. . . .

We were supposed to get the names of everyone we photographed, especially the generals. No one, and I questioned all of them, knew the names of more than seven or eight. There were just too many generals.

I entered the big room and quickly motioned the boys to their cameras. We were ready. The correspondents, radio announcers, and stenographers were already filing into the room. Colonel Bishop was busily showing everyone their places. All Colonels and lower rank, a solid bank of them, were placed behind the American generals' chairs.

An interesting sidelight was the chairs. The American generals had huge, imposing, straight-backed, carved chairs. The Japs, on the other side of the table, had those small folding chairs, made of slats.

The wide double doors were suddenly opened and two MP's stepped inside. All eyes were turned on the doorway. There was a dramatic pause, and in came the Japs. Yamashita, third in line, was instantly recognizable. He was not tall, but large and heavily jowled. A hard, strong face. Necks craned, correspondents scribbled and cameras flashed as Colonel Bishop pointed out each Jap's chair. They sat down. Two Jap interpreters that Yamashita had brought along took their positions, standing behind the seated Japs.

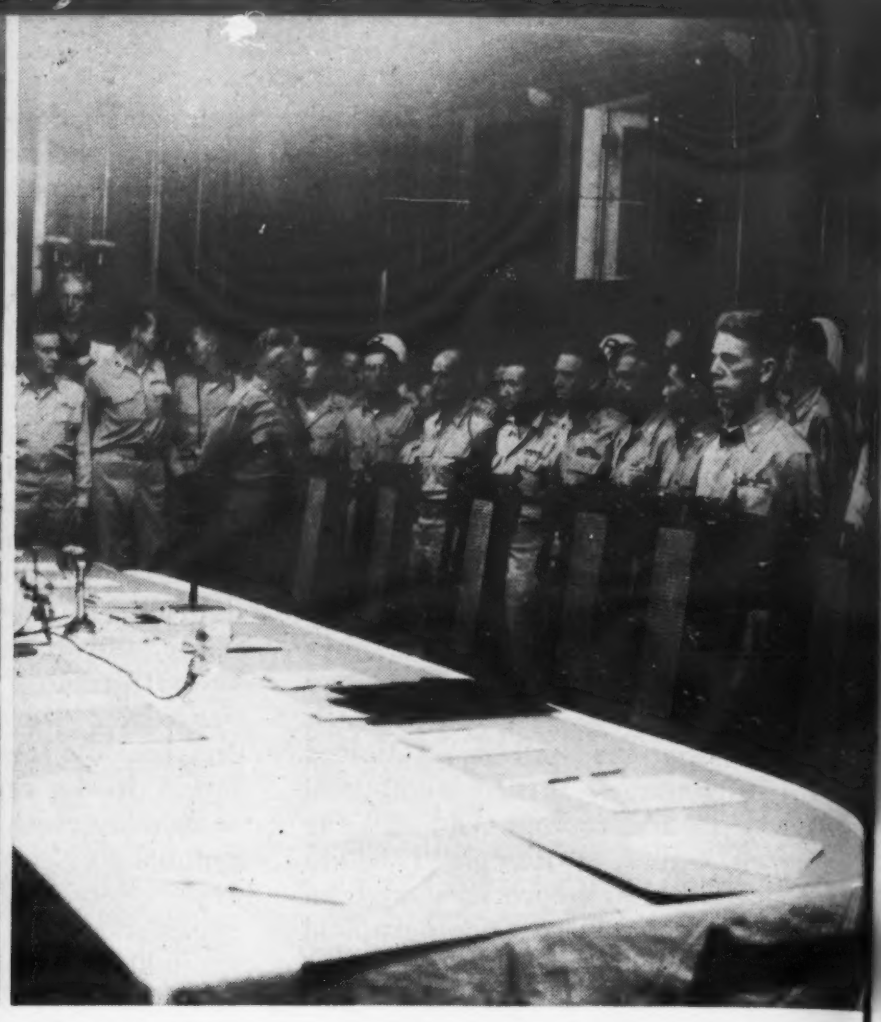
A wait of about one minute followed, then someone boomed, "Attention!" Everyone rose and stiffened as the American generals filed in from a door at the opposite end of the room. First came Brigadier General McBride, then Commodore Gillette, followed by Major General Beightler, Major General Wood, Lt. General Sir Arthur Percival — the British commander who surrendered Singapore — Major General Leavey, Lt. General Styer, Lt. General Wainwright and Major General Swift.

The Surrender

GENERAL Leavy said, "Please be seated," and the proceedings were under way. The General continued, "I am present here this morning as the Deputy Commander, United States Army Forces, Western Pacific, and representing the Commander-in-Chief, United States Army Forces, Pacific, to accept the surrender of the Japanese Land, Sea and Air Forces in the Philippine Islands. General Yamashita, there will now be read the Instrument of Surrender. General Wood, will you read the Instrument of Surrender?"

By this time I was getting nervous. Our thousand-foot magazine load Wall sound camera had been running continually ever since the American generals walked in. I didn't want to run out of film. I had been switching lenses from the 30 mm. to the 50 mm. and back again and then to a 6-inch for a close-up. I was just about to swing back to the 50 and whispered to Joe Benes, my first cameraman, "How much footage?" He mouthed, "200 feet." I shook my head. We had to have the terms of surrender. General

Gen. Yamashita en route to surrender ceremonies.



"Everyone stood stiffly at attention."

Wood was well under way. The terms ran for three minutes and Joe would signal me by holding up fingers what lens to switch to. When General Wood completed the surrender terms, General Leavey spoke.

"General Yamashita, you have heard read the Instrument whereby you surrender all Japanese Land, Sea and Air Forces in the Philippine Islands to me, acting in behalf of the Commander-in-Chief, United States Army Forces, Pacific. Are you ready to sign the surrender document?"

Yamashita hadn't understood a word. He jabbered something and his interpreter leaned close to his ear and said something in Japanese. Apparently it was taken for an affirmative "I am" as General Leavey spoke again.

"Colonel Bishop, will you place before the representative of the Japanese Armed Forces the Instrument of Surrender, to be signed?"

Colonel Bishop, a nice guy who kept reminding me of the actor, Porter Hall, walked around the table with four copies of the Surrender Instrument. They must have sprung out of thin air, four large leather portfolios, legal size, with gilt imprint on the face of each. I stopped the Wall camera. The other two cameras, 400′ magazine load eyemos, were rolling like mad. That was good. I picked up my hand held eyemo and moved within about three feet of Yamashita's back. He had ignored the pen proffered him and produced his own. He began to sign. He wrote his name in English, preceded by some Japanese characters. When he finished one document, another was promptly laid before him. I began shooting and Colonel Bishop moved squarely in front of my lens. I took a quick look about, ducked below one of the eyemos and took my position beside the Australian cameraman. But that darned guy had moved his camera and my position was bad. I was getting desperate. Yamashita had just completed signing the third copy. I stepped forward and placed my camera on the table, glued my eye to the finder, and began shooting as he started the fourth document.

I had continually glanced at General Wainwright. He never took his eyes off Yamashita, nor did his expression change from one of solemn aloofness. General Percival rarely looked at anyone but Yamashita. I presume those two were remembering the long years of incarceration. Truly, it was a bitter sweet moment for them. As Yamashita signed, only the low hum of the radio announcers' voices and our cameras, sounding like pre-war Ford trucks on a still morning, could be heard. Adams, the CBS man, later informed me that the eyemos had completely ruined his broadcast to the States. I barely refrained from telling him it was his own fault as I had asked him to take his position beside the Wall camera, which is fairly silent.

As each copy was signed and nicely blotted by Colonel Bishop, he handed the signed copy to Major Beckwith. Upon the completion of the process, Colonel Bishop, Major Beckwith and Captain Wood moved around the table and stood behind General Leavey. Colonel Bishop laid the copies before General Leavey.

General Leavey spoke. "In behalf of the Commander-in-Chief, United States Army Forces, Pacific, I hereby accept the surrender of all the Japanese Land, Sea and Air Forces in the Philippine Islands."

General Leavey commenced signing. I had the Wall camera running on him to record his voice. I ordered Joe to cut. I watched closely and as the fourth copy was signed I signalled Joe to start the Wall.

General Leavey spoke again. "I will now have affixed to each copy of this instrument the official seal of the United States Army Forces, Western Pacific."

Colonel Bishop did it again. He would insert a page and Major Beckwith pumped on the sealing machine. They finished and General Leavey again spoke. "General Yamashita, I now deliver to you, as the senior representative of the Japanese Armed Forces in the Philippine Islands, one official copy of this Instrument of Surrender for transmission to your government."

Captain Wood took the copy, walked around the table and placed it in Yamashita's hands. General Leavey waited until Yamashita took it, and then said, "This concludes the surrender ceremony."

Someone boomed, "Attention!" Everyone rose and stood stiffly. The

American generals marched out the same door they had entered. General Wood, I believe, said, "Major Kenworthy, will you escort the Japanese to their final destination." Poor Major Ribbons. He hadn't been expecting that. He jumped to attention, saluted, "Yes sir!" His white-gloved hand tapped Vice Admiral Arima's shoulder. The thumb jerked toward the door as he muttered, "Out!" He tapped Yamashita and he and his thumb again jerked "Out!"

The Japs, one by one, got up and filed out, escorted by MP's. They went upstairs, presumably to pack but it was part of the arrangement so the American generals could leave first.

From then on it was somewhat confusing. A few generals left, some remained behind. I had an officer courier waiting to take off with the film as soon as it was unloaded and canned and the caption sheets made out. He had a schedule to meet in order to get the film off to New York that night. I had two eyemo men outside to photograph the American generals and the Japs as they left. I waited as long as I dared, then called them in to can their film. My boys were grouped around the long conference table, working like mad. Some had their arms deep in black loading bags, others were writing or typing captions.

Colonel Bishop, looking excited, fatigued and delighted, came over to where I was writing captions. "How'd it go for you, Lieutenant?" He was like a boy, who, having performed work well, was anxious to have the opinion of others. I was sincere. "Colonel, you not only conceived an impressive ceremony, you somehow managed to make it flow smoothly. In spite of all the people and rank confusion, it progressed beautifully." The merest tinge of satisfaction and "God, how I worked," crossed his face.

By this time, even the KP's were in the room discussing the affair. The place was a bedlam. I jumped up. "Give me your attention," I shouted. "We are about to record sound and must have absolute quiet. Will everyone whose work does not require him in this room please leave."

I had acted on impulse and actually it was presumptious. A mere second lieutenant, the lowest of the species. Bless the good Colonel Bishop. He jumped up. "Will everyone please leave so the cameramen can finished their work." He motioned to the MP Major who immediately went over to him. He said something and in a few moments Major Ribbons was busily placing guards at the various doors.

Suddenly, there was a commotion outside. The Japs were leaving. Yamashita was in the first jeep with Major Ribbons as guard in the front seat. Then two Japs and two MP's rode in the following jeeps. One by one the jeeps pulled up before the entrance and quickly drove off, forming a convoy at the end of the driveway. The Japs kept in the tents overnight were brought to the archway and loaded. Yamashita, parked in the lead jeep, got a big play. I went over. It was raining and I turned up my collar and stuck my hands into the side pockets of my combat jacket. The old boy was signing autographs like mad. And, from the rapt expression on his face, he was having the time of his life. Major Ribbons came bustling up, dispersed the crowd and got into the jeep. He gave a big wave of his arm and the convoy started to move out. I hurriedly returned to the Big Room. The officer courier had gone with the film and our work was finished. We wrapped up leisurely and prepared to depart.

About halfway on the long drive back we stopped for coffee at an American Red Cross canteen. Canteen, did I say? A Nepa hut was thrown up against the fence. We were deep in the rice paddy country. Yes—they actually had a Red Cross girl there who noticed our arm patches and guessed where we'd been.

Lee, our power man, had quite a lisp. And he was telling her about the rubber glove used by the doctors to examine Yamashita. It had been sold as a souvenir for 300 pesos.

"Y'know the glove," he said, "with the finger, the finger . . ." He was on fire with intensity and motioning graphically. I grabbed him and fled.

"He wrote his name in English, preceded by some Japanese characters."

the CROWDER STORY . . .

By Colonel Robert G. Swift

Wartime Asst. Commandant, Central Signal Corps School

LONG BEFORE Pearl Harbor it had become apparent to the Chief Signal Officer that available facilities at Fort Monmouth could not suffice for all the specialists that would be needed for the communication teams of our rapidly expanding armed forces. No sooner had the first selectees reported to the Signal Corps Replacement Training Center at Fort Monmouth in February 1941, than it was recommended that another replacement center be established in the Middle West to accommodate an additional 10,000 trainees.

Approval was given to establish a Signal Corps post near Neosho, Missouri in June 1941. Original plans authorized a capacity of 5,000 for the new training camp but, before the formal activation on December 1, the Secretary of War directed that Camp Crowder, as the establishment had been named, be equipped to handle a capacity of 15,500 Signal Corps troops. Colonel (later Maj. Gen.) William S. Rumbough was selected to command the new training center.

In spite of serious construction delays, resulting from prolonged rain and mud, the first trainees were received on February 15, 1943, and classes were started on the 19th of that month. The Chief Signal Officer was responsible for formulating training doctrine and the conduct of instruction, and the staff was responsible to the Seventh Service Command for administration.

Initial Operations

THE INITIAL courses of instruction included basic training in Military Courtesy, Basic Signal Communication, Interior Guard Duty, and then selection for assignment to advanced schools on a basis of background and aptitude. By April the training center was handling a load of 11,714 students and had a staff of 269 officers and 1,931 enlisted men.

The Missouri Camp was the central link in a Signal training network that reached from New Jersey to Californa to Florida . . .

The original cadre of both officers and enlisted men were selected from the staff at Fort Monmouth. It was necessary, however, for the greater amount of the camp overhead to be furnished from other sources. Most of the additional enlisted cadre were former National Guard men, not physically qualified for duty with their own units. They had neither the background nor the aptitude for duty with the Signal Corps and eventually had to be replaced with incoming personnel as the training cycle progressed.

In addition to the usual courses for basic Wire, Radio and Message Center Personnel, and for the common specialties in the cook, clerk and motor classification, an eight-week course was given for Aircraft Warning Plotters. Conducted in three phases, this course covered map reading, aircraft identification, organization and duties of information-center personnel. In the final phase the students participated in an actual field problem and were rotated in the various duties performed by information-center personnel.

A representative of the Inspector General reported, after a visit to Camp Crowder in May 1942, that while more commissioned personnel were needed at the Signal Corps training installations, instructional methods were excellent, training facilities and expedients adequate.

By the end of the fiscal year the RTC had received 26,280 enlisted men from reception-centers. Of this group, 1,911 had been transferred to the Signal School at Fort Monmouth for advanced training, 2,074 sent to civilian schools, 10,187 assigned to units and 12,118 were still in various stages of basic training. The installation rapidly rose to a size that overshadowed the RTC at Fort Monmouth and made it the largest Signal training center in the country.

With the planning and the establishment of a second Signal Corps RTC at Camp Crowder, it was evident that, in spite of every possible extension of the Signal Corps School at Monmouth, at which many trainees would continue their instruction, the facilities would be taxed far beyond their capacity. The Chief Signal Officer, therefore, contemplated establishing a new school with a capacity of 1,450 students to be operated under the Commanding General of the RTC at Camp Crowder.

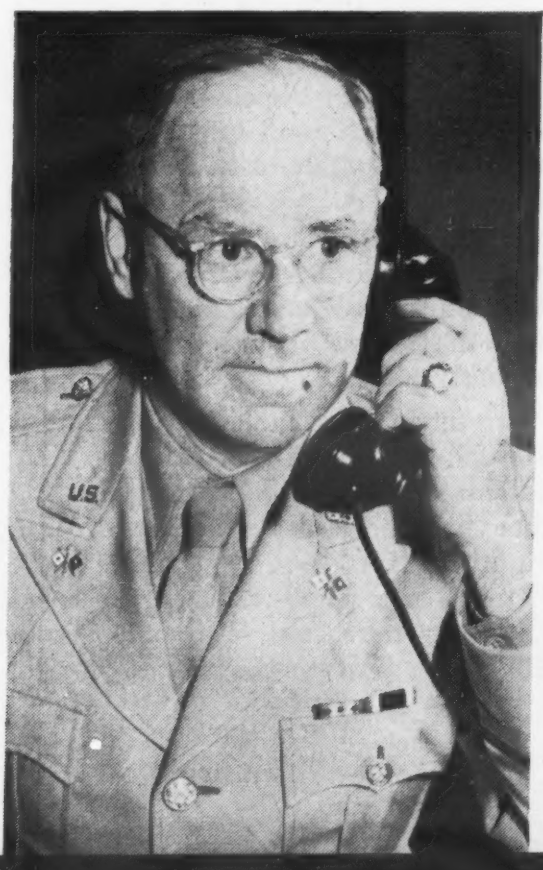
When General Olmstead formally requested authority to establish such a school in December 1941, events indicated the necessity of raising this figure to 2,500 trainees. Approval was granted on January 30, 1942, and work was immediately begun on the construction of necessary school and personnel housing, to be completed prior to June 30. It was activated on March 18, together with the 80th Signal Service Regiment, with a strength of 38 officers, 4 warrant officers and 640 enlisted men. Major General Walter E. Prosser was designated as Commandant.

Missouri School

Lt. Col. Paul L. Neal, Director of the Officer's Department at Fort Monmouth, was appointed Assistant Commandant at the new school, and he immediately began assembling a cadre from among the staff at Monmouth and preparing the necessary requisitions for supplies and equipment that would be needed at Crowder. Colonel Neal's duties would not permit his release from Fort Monmouth until June 1 and at his suggestion, Major R. G. Swift, former OIC of the Wire Division in the Enlisted Men's School, was placed on temporary duty at Crowder as Acting Assistant Commandant. He had hardly reported to General Prosser on April 18 than the Commandant was directed to increase the school facilities to handle 6,000 students. The strength of the enlisted cadre was increased to 1,565.

Plans were immediately made to enlarge the school building program. It was also decided to operate the academic activities on two shifts as a means of conserving buildings and equipment, when the student load required such action. Requisitions were revised and suitable action taken locally to provide the minimum amounts of specialized training equipment that would be needed to start classes. Much of the designing and purchasing of this equipment was performed by Lt. H. W. Sibert, who was later to distinguish himself as the director of the Common Subjects

Prominent among Crowder's commanders were Maj. Gen. Walter E. Prosser (left), Brig. Gen. Chas. M. Milliken, and Brig. Gen. Calvert H. Arnold (right).



Camp Crowder sprawled across the bleak Missouri countryside.

division and as OIC of the technical field training.

The first group of students consisted of 400 men from the RTC, and they were enrolled on July 1, 1942. The initial instructional staff numbered about 700 officers and enlisted men. Although a sufficient number of these to provide a coverage in each course were former Monmouth personnel, the majority were selected students with a civilian background in their specialties whch made it possible to add them to the faculty with a minimum of training as the student load increased.

An intensive campaign was conducted to augment the school staff with civilian instructors, working under Civil Service. This source furnshed a small number of capable teachers durng the life of the school, but did not reach a maximum until 1945 when enlisted personnel, upon separation from the service, were hired as their own replacements.

Three-month courses were conducted for Cable Splicers, Framemen, Insidemen, Common and Local Battery Installer-Repairmen, Powermen, and High Speed Radio Operators. Four-month courses were given for Radio Electricians, Fixed Station-Radio Operators, Repeatermen, Switchboard Installers, Telegraph Printer Maintenance Men and Wire Chiefs. A special 20-week course covered the maintenance of Aircraft Warning Plotting Board equipment.

In a five-month period the enrollment at the school jumped to 5,000 with over 10,000 students being enrolled during this time. It continued to grow until May 1943, when a peak of 8,993 was reached. Over half of the students at this time were from the Air Corps.

The facilities of the school were made available to the tactical Signal Corps units being trained at Camp Crowder under the administration of a Second Army detachment. Many of these organizations were affiliated units from telephone companies of the Bell System. At the peak of the training cycle over 1,200 men from these units were enrolled in the school. Although frequently censured by the School Branch of the Army Service Forces for accepting students from a source not specifically allotted a quota, the School consistently adhered to the policy of General Prosser in extending every possible assistance in the entire training establishment to the tactical units which had neither the facilities nor the personnel to conduct the technical training that they urgently needed.

In setting up the organization of the school, several innovations were added to the academic department that had not existed at Fort Monmouth. A third section, designated the Common Subjects Division, was added to the usual Wire and Radio Divisions. All new students, except radio operators, were initially assigned to this division for instruction in Principles of Electricity and Basic Shopwork.

The training and Co-ordination Branch, initially organized to assist in staff planning during the early growth of the school, absorbed all activities and responsibilities pertaining to statistics and reports, co-ordinated the preparation and allotment of subject matter in allied sub-courses and programs of instruction, reviewed text material prior to publication, prepared training aids and operated the instructor training and vocational guidance activities. Major Thomas F. Strawn served as chief of this branch from the time of its organization until his separation from the service in December 1945.

An organization, designated the processing department, was charged with interviewing, classifying and enrolling all new students. It operated under the direct control of the School Secretary.

By September 15, 1942, the enrollment in the school had grown to a size that required a second service regiment and the 804th Signal Service Regiment was activated, with Colonel S. P. Fink as its commanding officer.

Unit Training

WHEN General Prosser arrived at Camp Crowder in the Spring of 1942, he found, in addition to the Signal units administered by 2nd

Monitoring and "jamming" practice on radio nets at CSCS.

Army, a number of field organizations whose training and supervision was not co-ordinated and which were working more or less at loose ends.

Since the mission of the Midwestern Signal Corps School was concerned primarily with the soldier as an individual, it was difficult to place these units under the school without disrupting its operation. General Prosser, therefore, conceived the idea of a separate division of the school basically to supervise unit training among the activated tactical Signal Corps units at Camp Crowder.

The Unit Training Center was organized in July 1942, as a subsidiary of the MSCS, with the mission of directing, supervising, and inspecting the basic, specialist, team and unit training for efficient field service. Colonel James Lawrence became its acting commanding officer and immediate efforts were made to obtain recognition for the new installation, as separate and distinct from the school.

In September, General Prosser's plan for the establishing of a Midwestern (later Central) Signal Corps Training Center was approved. Under the direct control of the Chief Signal Officer it would supervise the School, the Replacement Training Center and the proposed Unit Training Center. MSCTC, however, was given the sole mission of supervising and co-ordinating the training within and between the elements comprising the center. All administrative functions were placed under control of the camp commander and the Seventh Service Command.

Increased emphasis was placed on basic military training in the Fall of 1942, with the training period being increased from two to four weeks. To assist in accomplishing this at the RTC, the responsibility for its conduct was assigned to the 6th and 7th Regiments. At the same time, the Basic Training School was abolished and the responsibility for conducting the program placed upon the unit commanders. The training was scheduled so that at least one battalion was beginning the cycle each week. This insured efficient use of facilities and equipment, promoted the maintenance of a smooth flow of trainees from the reception centers, through basic training to specialist schools, and simplified the problem of completing the training of soldiers who lost time due to hospitalization. Instruction in defense against chemical, mechanized and air attack were added to the programs, together with demonstrations of night operations. Time devoted to rifle marksmanship was increased from 38 to 54 hours. The lessons of "blitz" warfare were influencing even the basic education of the American technical soldier.

The additional time, plus an improvement in the quality of recruits and instructors, and the introduction of certain training aids, led to a noteworthy improvement in rifle marksmanship. Whereas 25% had qualified in May 1942, the figure for the Camp Crowder RTC one year later was 91%.

The general quality of personnel assigned to Camp Crowder for training in 1942 was not entirely satisfactory. Many of the low intelligence men in Groups IV and V could not be trained in any of the specialties given at the RTC. The situation grew progressively worse with the percentages in these groups reaching 40. Some were trained as linemen or chauffeurs and many more were shipped out as basics, but this left an insufficient number of qualified men to be trained in advanced specialties, and as a result, a backlog accumulated of over 4,200 specialists required as fillers for Signal Corps units, or for duty with ground or air troops.

During the fiscal year ending June 30, 1943, over 66,000 trainees were enrolled at the RTC. Of this number, 30,084 were assigned to combat and service schools, 1,054 were enrolled in ASTP, 1,548 went to Air Cadet and Officer Candidate Schools and 36,000 were assigned to units, installations and replacement depots.

Two major changes in command were made in January 1943. Brig. Gen. Charles M. Milliken, replacing Col. R. A. Willard, assumed command of the RTC; and Brig. Gen. H. L. P. King was named Commandant

Forming a weird silhouette, students learn the techniques of pole climbing at Crowder, 1942.

of the Central Signal Corps School, replacing Col. Neal. Col. Swift was designated Assistant Commandant and continued to fill this assignment throughout the war.

As a result of the recommendations of the Assistant Commandant, the Chief Signal Officer approved certain changes in Signal Corps specialties. A single course for Installer-Repairmen was approved, the Insideman and Frameman courses were combined under the new designation of Central Office Repairman, and the Radio Electrician course was modified and redesignated Radio Repairman.

Although no quota had been allotted for training Repeatermen in the early part of 1943, the School staff, aware of developments being made in field types of repeater and carrier equipment, persisted in retaining its facilities for such a course. The wisdom of this move was demonstrated several months later. When production was started on the equipment, the school was suddenly directed to establish an adequate training course on it to handle a quota of 800.

During this same period the school was directed to set up a completion course for Radio Repairman on tactical FM radio sets, to develop courses for Radio Intercept Operators and for German Voice Interceptors. Each project involved the preparation of new instructional material and training equipment and the training of instructors in these specialized fields.

The CG of Camp Crowder also designated CSCS as responsible for the specialist and team training of foreign language Signal Center teams. Some 40 of these teams, composed of both Army and Navy personnel, were preapred for special missions by the academic department. Extensive specialized school and field training facilities were set up to give the personnel in these units a maximum amount of realistic practice in their specialized duties.

First Year

ON ITS first aniversary the Central Signal Corps School was the largest institution of its kind, with an enrollment of 8,704.

Ill health forced Col. Lawrence to relinquish command of the newly activated Unit Training Center. Colonel Willard assumed command in February 1943, and was immediately faced with the necessity of building a staff to handle an activity that was expanding beyond all foreseeable size. The original estimate of the personnel in the tactical units comprising his activity was 100 officers and 2,000 enlsted men. He was authorized a headquarters staff of 8 officers, 6 enlisted men and 16 civilians.

Colonel Willard succeeded in obtaining an increase in this staff and set about organizing it to care for the increased load that was evident. The administrative staff was subdivided so that close supervision of training in the units was constantly maintained. The Training and Requirements and Testing Branch of the Training Division immediately began to prepare up-to-date traning programs which included most of the new requirements of the War Department. Tests of a unit's ability to accomplish its mission were instituted. The inspection branch checked very carefully to see that each man was prepared for overseas shpment as far as his individual needs were concerned. This branch also inspected and recommended necessary changes in the administrative records of units to insure that they were properly kept. The Supply Division was subdivided to facilitate a more rapid distribution of training equipment. Every effort was made to speed the preparation of units for overseas service during those early months of 1943.

Beginning with the activation of the 823rd Signal Wire Operations Co., the 824th Fixed Radio Station Co., and the 825th Signal Repair Service Co. in July 1942, the UTC reached a trainee strength of 4,800 on

July 1, 1943, and this increased to 13,750 a year later. No corresponding increase in overhead was authorized. The commissioned staff was increased from 28 to 59 in March 1944, but at the same time the enlisted staff was cut to 101. It was only by utilizing officers and enlisted men from the 847th Signal Training Battalion that the problem of additional necessary overhead was met.

The scope of unit training at Camp Crowder was broad. Radio Intelligence Companies, heavy and light Construction Battalions, Depot and Repair Companies, Installation and Operation Companies, Service Battalions, Messenger Companies and Maintenance Companies—all studied at this Central Signal Corps UTC and developed the teamwork that was an essential preliminary to overseas service.

The rapid growth of the UTC created problems of housing and training space, although the terrain within the Camp Crowder reservation was comprised of natural training areas of almost any type desired. There were heavily wooded sections, excellent for bivouacs and fixed radio stations, and flat open bottom lands suitable for pole line construction. Streams ran through several of the areas. Vacant farm houses and outbuildings on the reservation housed radio installations, telephone switchboards, repeater equipment and power units. On the whole, the area was found to be unusually well adapted to night problems, bivouacs and the various types of specialized training being conducted.

The facilities afforded by the Camp Crowder Theater headquarters and its subordinate installations provided actual field operating experience that was an outstanding achievement in training during 1943 and 1944. The theater was equipped to train T/O 11-500 teams of the various types under simulated theater of operations conditions, 24 hours a day, in all the agencies and means of communications normally found in higher echelon signal centers.

Shortages of equipment presented a major difficulty in training teams in 4th and 5th echelon repairs. This obstacle was overcome by placing the teams on detached service at depots and at a repair training setup operated by the Central Signal Corps School.

In June 1943, Col. (later Brig. Gen.) C. H. Arnold replaced Gen. King as Commandant at CSCS. He brought with him a wealth of field experience, resulting from his tour of duty in the South Pacific, that was immediately reflected in the school training program. His initial efforts to inject this experience into the school courses resulted in all specialists being trained in the basic principles of operation and maintenance of power units. This was followed by the introduction of systematic "jamming" during the field trainnig of all radio operator students. Under constant practice the students developed remarkable abilities to copy without error, through intense man-made interference.

A series of week-end field exercises, started during the summer of 1943, developed into a three-week cycle of "on-the-job" training for all school specialists upon completion of their classroom instruction. Men trained for duties in operating units of the Signal Corps installed and maintained full scale communication networks, while repair personnel operated a model radio repair depot. This installation was later expanded to include a Wire and Teletype repair depot and facilities for making major repairs on power equipment.

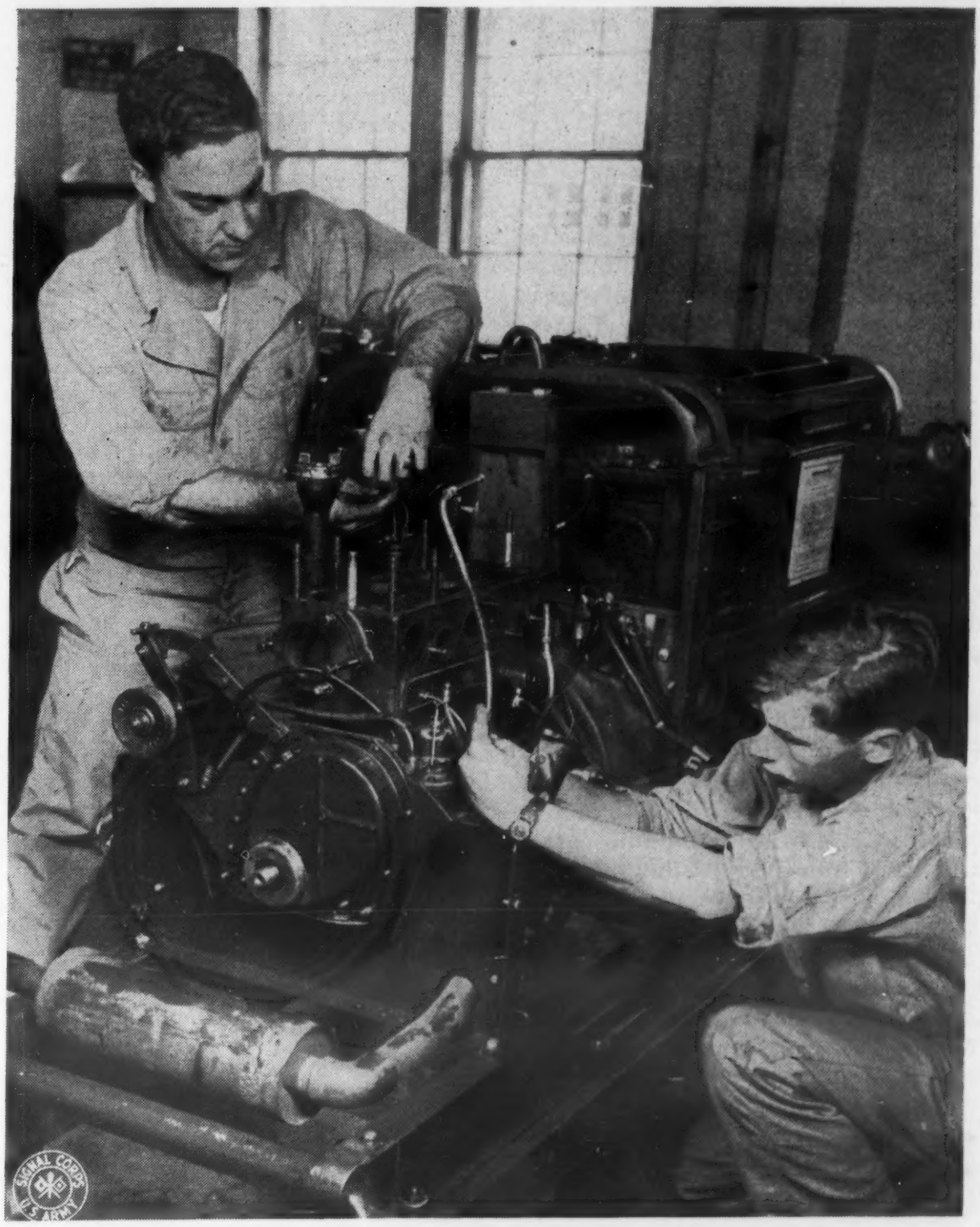
In September of 1943 Col. Arnold set up a section to centralize the concurrent military training activities in the student regiments. Its activities expanded to such a degree that in December control was transferred to School Headquarters and placed under the supervision of Major M. E. Galusha, who had successfully operated a similar activity at Fort Monmouth.

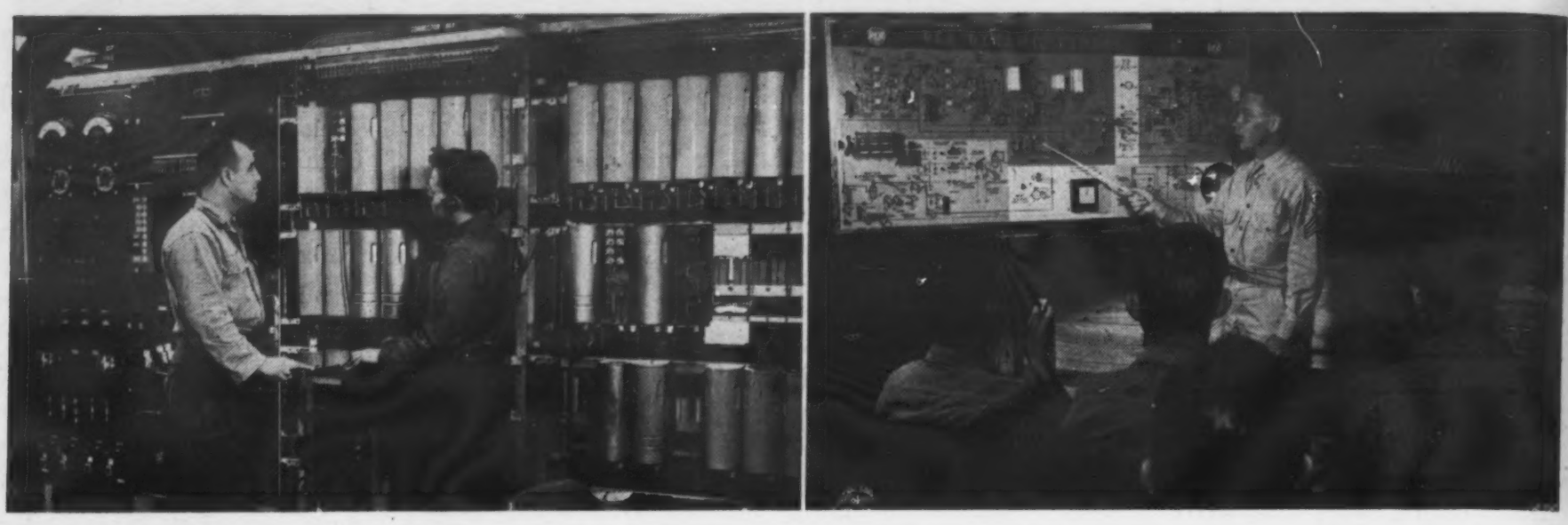
During the fiscal year 1943-44 the School enrolled 18,474 students, graduated 14,803 as qualified specialists, dropped 4,411 for miscellaneous reasons and had 7,965 in training on June 30, 1944. Of the students relieved, only 7% were dropped because of inaptitude or misconduct.

Refresher Training

INCREASED attention was given during this period at both the RTC and CSCS to providing refresher training for returning overseas vet-

Assembling gasoline-driven power unit in Power Eqpt. Maintenance Labs. at CSCS.





(left) Students make current flow tests on step-by-step telephone equipment. (right) Instructor lectures on theory of superheterodyne.

erans and for men reassigned from posts, camps and stations within the United States. The Basic training cycle was further increased to 6 weeks in August 1943. Many new training aids were developed and they played a major part in increasing the efficiency of basic training and in adding interest to instructon that might otherwise have become objectionable, particularly to returning veterans to whom it was given entirely on a refresher basis.

The RTC training staff expanded its facilities to provide for anti-aircraft firing and increased combat training in battle conditioning, including familiarization with mines, mine fields, grenades, village fighting and practice on the infiltration course. An increase in the total training cycle, coincident with that in basic training, permitted the establishment of field exercises involving team participation. An elaborate system of field installations furnished facilities for conducting exercises at division, corps and Army levels, with all the specialists trained at the RTC performing their normal co-ordinated duties as members of a signal organization. The problem required 3 weeks, giving each man an opportunity to perfom his duties in a headquarters at these three levels.

Code training benefitted greatly from Research Project SC-88 which psychologists from the National Defense Research Council carried on in co-operation with the Radio Training Section of the RTC and the Radio Division of CSCS. Fundamentally, a new method of instruction was developed which utilized a stronger motivation factor than its predecessor.

The beginning of 1945 saw the planning and the start of training for the redeployment of troops to the Pacific. Rotation of officer and enlisted personnel overseas, to replace veterans being returned from those theaters, made it difficult to provide the installations with sufficient qualified instructors. Sudden changes in training doctrine and techniques only aggravated this problem and no satisfactory solution was found.

The most important organizational change at a Signal Corps training establishment came at Crowder's Army Service Forces Training Center when the Basic and Specialists Command and the Unit Command were eliminated in March 1945. In their place three training groups were actiavted: Signal, Medical and Branch Immaterial, to provide for the newly authorized medical instruction at Camp Crowder and for the reduced Signal Corps enrollment.

In February the Medical ASFTC at Camp Barkley, Texas was discontinued, and the training of Medical Personnel transferred to Camp Crowder's ASFTC. To properly administer this new activity, the organizational changes described above were accomplished. The Signal Training Group was to handle the technical training of individuals and T/O units; the Medical Training Group to perform the same function for the medics; and the Branch Immaterial Group to conduct refresher military training for men with prior service and also the technical instruction of personnel with MOS's common to both Signal Corps and Medical Corps.

The basic military training which had been transferred to Ft. Leonard Wood in February was again resumed at Camp Crowder in April, and the duty of conducting this training was assigned to the Branch Immaterial Group.

Units of the 8th Training Regiment assumed the responsibility and duty of conducting technical Signal training in addition to their housekeeping activities, and they conducted the training for linemen, switchboard operators, riggers, radio operators, pigeoneers and signal center personnel.

The Branch Immaterial Group handled technical training common to both branches, such as chauffeurs, cooks, mechanics and clerks.

The strength of the ASFTC increased by 10,000 during the first half of 1945. It jumped from 971 officers and 13,007 enlisted men on January 1st to 845 officers and 23,098 enlisted men on June 30. The total input was 25,749. Of this number 9,877 were Signal Corps, 9,488 were Medical and the remainder were basics. A total of 15,482 completed their training and were assigned.

In December 1944, CSCS had been given the responsibility for preparing all programs of instruction used for training enlisted personnel at Signal Corps Schools, and in accordance with instructions from the Chief Signal Officer had completed a set to be placed in effect after the defeat of Germany. They incorporated many suggestions made by Lt. Col. G. L. Martin, director of the Radio Division, who had accompanied General Milliken on a tour of the Southwest Pacific Theater of Operations. Other officers, recently added to the faculty, upon return from overseas duty, added many valuable contributions to these programs.

The student load at CSCS in January 1945 — approximately 2,600 — compared with the authorized strength of 6,000. This figure was reduced to 4,000 on January 30 with a proportional reduction in the authorized overhead. The actual strength increased until it totaled approximately 3,000 on June 30.

In order to minimize the effect of personnel cuts, General Arnold directed certain organizational changes. The supply branches of the three academic divisions were consolidated with the property branch and the entire supply setup transferred to the control of the Assistant Commandant. The administrative sections of the three divisions were also consolidated

and centralized at school headquarters. This reduced the action points for handling academic records by 44%. It also gave more direct contact between members of the staff, reduced floor space required for administrative purposes, centralized student processing and enrolling and permitted a 28% cut in administrative personnel.

Camp Crowder lost its wartime commander when on June 10, 1945 Maj. Gen. Walter E. Prosser, having reached the retirement age, was replaced as Commanding General by Brig. Gen. C. M. Milliken. His accomplishments were recognized by the War Department by the award of the Distinguished Service Medal. Brig. Gen. T. J. Tully replaced Gen. Milliken as CG of the ASFTC.

On June 14 Brig. Gen. C. H. Arnold was relieved as Commandant of the Central Signal Corps School to head the Distribution Division in the Office of the Chief Signal Officer at Washington. His successor, Brig. Gen. Garland C. Black, had a distinguished record as Signal Officer for the 12th Army Group during field operations in the European Theater.

French Mision

PRIOR to VE-Day, Col. Swift had been selected to accompany Col. J. D. B. Lattin on a survey of French Signal Corps training facilities in Europe and North Africa. Their mission involved the submission of recommendations for introducing American instructional methods into the French training installations. As a result of the plan submitted by these officers, a group of commissioned and non-commissioned officers from the French Signal Corps arrived at Camp Crowder to be enrolled as students at CSCS. In spite of unfamiliarity with the English language and technical terms, this group made an outstanding record during their 8-month stay.

In August the "on-the-job" training program at CSCS and field exercises at the RTC were discontinued, and applicatory training was restricted to the School area. In September the basic military training program, for school students, was discontinued, and the work week in classrooms cut from 40 to 36 hours.

Increased emphasis was placed on the use of training aids with over 900 two-dimensional aids being prepared during the last half of the year. As a guide to other schools and for future Signal Corps reference, a catalog of the more outstanding training aids was prepared and published at CSCS.

Brig. Gen. Black assumed command on September 13, 1945, relieving Col. Fink, the Commanding Officer of the Service Regiment, who had assumed the post of acting commandant upon the departure of Gen. Arnold. Ill health forced his retirement a short time later.

There was a marked letdown in training proficiency during the closing months of the year. Trained instructor personnel were separated from the service in ever increasing numbers. To obtain replacements the intensive campaign was continued to replace soldiers with civilians and the men being separated were urged to return to their teaching jobs under civil service.

Although the students relieved for inaptness jumped to 10%, due to lack of interest with the end of the war, 52% were relieved without completing their courses for such reasons as discharge, transfer to other schools or units, recall to home units, and transfer to overhead.

Colonel Elton T. Hammond, who had served as Signal Officer for General Patton throughout the war, was named to replace Gen. Black at CSCS. He assumed command in January 1946.

The death knell of Camp Crowder as a Signal Corps training center was sounded shortly atfer Col. Hammond's arrival when the Chief Signal Officer directed that activities incidental to school training of enlisted personnel be discontinued and reactivated at Fort Monmouth. The plans directed a bodily movement of plant and personnel without a break in training. A similar directive to Gen. Milliken ordered the movement of the RTC to Camp Polk, La.

Col. R. G. Swift served as Asst. Commandant of CSCS from Jan. 1943 until Mar. 1946.

Upon completion of preliminary surveys of remaining facilities at Fort Monmouth, a detachment headed by Lt. Col. Galusha was ordered to Monmouth to organize the activities at that post and students were enrolled on March 1, 1946.

The movement of personnel and equipment continued as successive courses were discontinued at Crowder. Col. Swift was transefrred to Monmouth to head the enlisted school activities on April 1st and Col. Hammond assumed command as the transfer was completed on June 1, 1946.

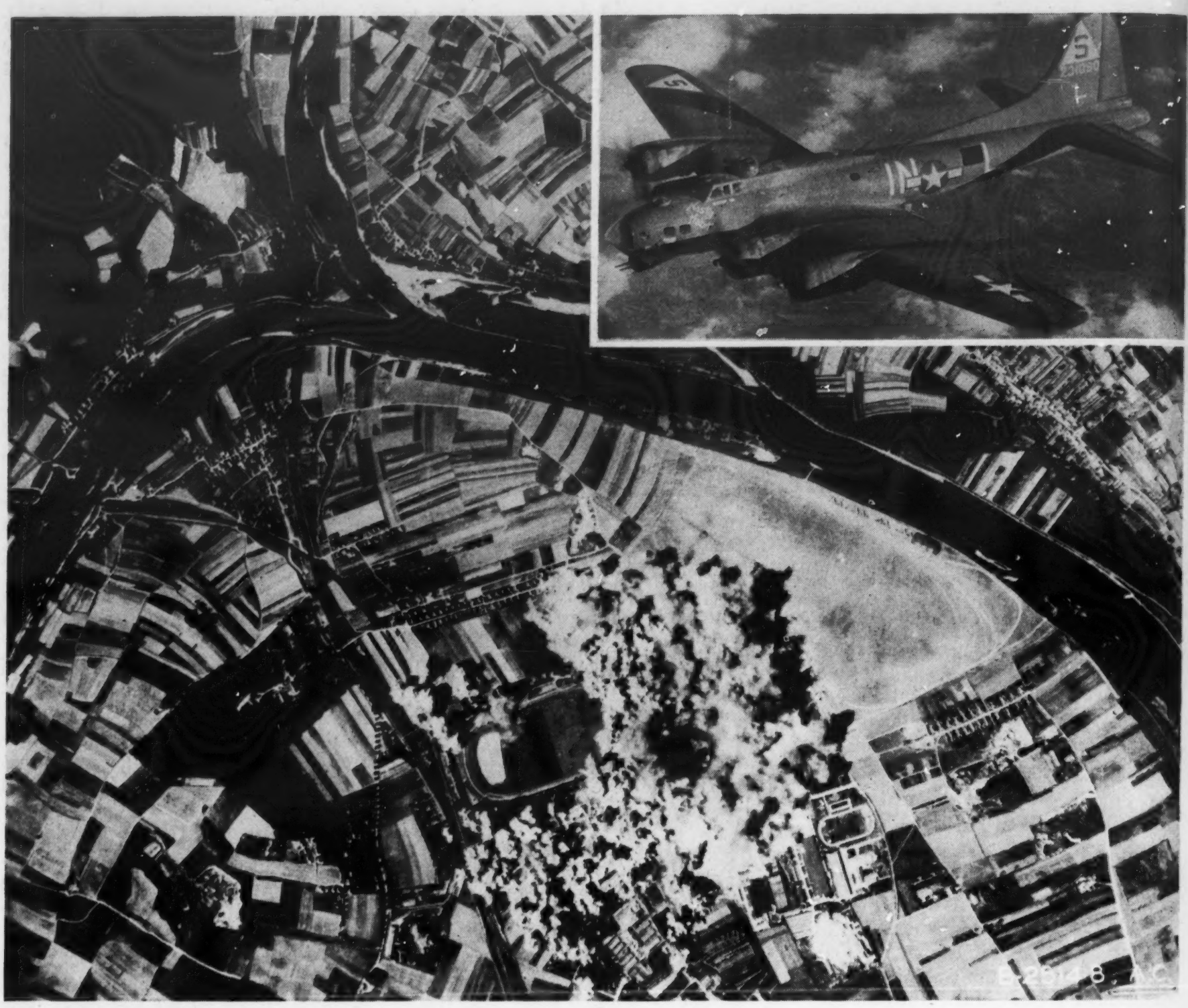
The story of Signal Corps training at Camp Crowder is more than a history of men and equipment working to fulfill programs of instruction. The accomplishments of the organizations at this post represent the best efforts of a group of highly competent individuals, possessed of widely differing talents and temperaments, guided and directed by a leader who never forgot his primary mission: that of turning out a maximum number of Signal Corps troops and units fully qualified to perform their combat missions.

Such men as General W. S. Rumbough, who original plans for the camp figured largely in its later expansion, and his successors — Col. Willard and Gen. Milliken — displayed a deep understanding of their job by solving all of the many vexing problems that confronted them. The names of Shute, Ware, Daley, Anderson, Bean and many others on the RTC staff will long be associated with the highest standard of competent and cooperative staff work.

The Central Signal Corps School was equally fortunate in being able to obtain competent executives with the proper technical backgrounds to supervise all of its major activities.

Each School Commandant, from General Prosser through Neal, King, Arnold, Black and Hammond, brought with them the background, experience, and the wisdom developed only through long years of command and raised its standard as a Signal training organization that was second to none.

Camp Crowder is now little more than a name but its accomplishments will continue to be a matter of pride to those who were privileged to serve there and contribute in some measure to its wartime successes as a unit in the Signal Corps training establishment.



By Col. Beirne Lay, Jr.

An excerpt from Air Force Diary, this is a copilot's report to his CO on "the greatest daylight aerial battle in history"

A few days earlier the oil refineries at Ploesti, Rumania, had been bombed by 162 low-flying, Libyan-based B-24s in one of the war's most spectacular raids. The occupation of Kiska by U.S. and Canadian troops had been completed after a protracted aerial campaign waged by the Eleventh Air Force. The tiny island of Pantelleria in the Mediterranean had already surrendered to air power, and in another month the actual invasion of Italy itself would be undertaken. It was August, 1943, and the heavies of the 8th Air Force were out to level industrial facilities in Regensburg, South Bavaria. . . .

WHEN our group crossed the coast of Holland at our base altitude of 17,000 feet, I was well situated to watch the proceedings, being co-pilot in the lead ship of the last element of the high squadron. With all of its twenty-one B-17Fs tucked in tightly, our group was within handy supporting distance of another group, ahead of us at 18,000 feet. We were the last and lowest of the seven groups that were visible ahead on a southeast course, forming a long chain in the bright sunlight—too long, it seemed. Wide gaps separated the three combat wings.

As I sat there in the tail-end element of that many-miles-long procession, gauging the distance to the lead group, I had the lonesome foreboding that might come to the last man about to run a gauntlet lined with spiked clubs. The premonition was well founded.

Near Woensdrecht, I saw the first flak blossom out in our vicinity, light and inaccurate. A few minutes later, two FW-190s appeared at one-o'clock level and whizzed through the formation ahead of us in a frontal attack, nicking two B-17s in the wings and breaking away beneath us in half rolls. Smoke immediately trailed from both B-17s, but they held their stations. As the fighters passed us at a high rate of closure, the guns of our group went into action. The pungent smell of burnt powder filled our cockpit, and the B-17 trembled to the recoil of nose and ball-turret guns. I saw pieces fly off the wing of one of the fighters before they passed from view.

Courtesy: "Air Force"

REGENSBURG MISSION

The members of the crew sensed trouble. There was something desperate about the way those two fighters came in fast, right out of their climb without any preliminaries. For a few seconds the interphone was busy with admonitions: "Lead 'em more . . . short bursts . . . don't throw rounds away . . . there'll be more along in a minute."

Three minutes later, the gunners reported fighters climbing up from all around the clock, singly and in pairs, both FW-190s and ME-109Gs. This was only my fourth raid, but from what I could see on my side, it looked like too many fighters for sound health. A coordinated attack followed, with the head-on fighters coming in from slightly above, the nine- and three-o'clock attackers approaching from about level and the rear attackers from slightly below. Every gun from every B-17 in our group and the one ahead was firing, crisscrossing our patch of sky with tracers to match the time-fuse cannon-shell puffs that squirted from the wings of the Jerry single-seaters. I would estimate that seventy-five per cent of our fire was inaccurate, falling astern of the target—particularly the fire from hand-held guns. Nevertheless, both sides got hurt in this clash, with two B-17s from our low squadron and one other falling out of formation on fire, with crews bailing out, and several fighters heading for the deck in flames or with their pilots lingering behind under dirty yellow parachutes. Our group leader pulled us up nearer to the group ahead for mutual support.

I knew that we were already in a lively fight. What I didn't know was that the real fight, the onslaught of Luftwaffe 20mm cannon shells, hadn't really begun. A few minutes later, we absorbed the first wave of a hailstorm of individual fighter attacks that was to engulf us clear to the target. The ensuing action was so rapid and varied that I cannot give a chronological account of it. Instead, I will attempt a fragmentary report, salient details that even now give me a dry mouth and an unpleasant sensation in the stomach when I recall them. The sight was fantastic and surpassed fiction.

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The Yellow Noses

IT WAS over Eupen that I looked out of my copilot's window after a short lull and saw two whole squadrons, twelve ME-109s and eleven FW-190s, climbing parallel to us. The first squadron had reached our level and was pulling ahead to turn into us, and the second was not far behind. Several thousand feet below us were many more fighters, with their noses cocked at maximum climb. Over the interphone came reports of an equal number of enemy aircraft deploying on the other side. For the first time, I noticed an ME-110 sitting out of range on our right. He was to stay with us all the way to the target, apparently reporting our position to fresh squadrons waiting for us down the road. At the sight of all these fighters, I had the distinct feeling of being trapped — that the Hun was tipped off, or at least had guessed our destination and was waiting for us. No P-47s were visible. The life expectancy of our group suddenly seemed very short, since it had already appeared that the fighters were passing up receding groups, with the exception of one, in order to take a cut at us.

Swinging their yellow noses around in a wide U turn, the twelve-ship squadron of ME-109s came in from twelve to two o'clock in pairs and in fours, and the main event was on.

A shining silver object sailed past over our right wing. I recognized it as a main exit door. Seconds later a dark object came hurtling through the formation, barely missing several props. It was a man clasping his knees to his head, revolving like a diver in a somersault. I didn't see his chute open.

Four Balls of Fire

A B-17 turned gradually out of formation to the right, maintaining altitude. In a split second the B-17 completely disappeared in a brilliant explosion, from which the remains were four small balls of fire, the fuel tanks, which were quickly consumed as they fell earthward.

Our airplane was endangered by hunks of debris. Emergency hatches, exit doors, prematurely opened parachutes, bodies, and assorted fragments of B-17s and Hun fighters breezed past us in the slipstream.

I watched two fighters explode not far below, disappearing in sheets of orange flame, B-17s dropping out in every stage of distress, from engines on fire to control surfaces shot away, friendly and enemy parachutes floating down, and, on the green carpet far behind us, numerous funeral pyres of smoke from fallen fighters, marking our trail.

On we flew through the strewn wake of a desperate air battle, where disintegrating aircraft were commonplace and sixty chutes in the air at one time weren't worth a second look.

I watched a B-17 turn slowly out to the right with its cockpit a mass of flames. The copilot crawled out of his window, held on with one hand, reached back for his chute, buckled it on, let go, and was whisked back into the horizontal stabilizer. I believe the impact killed him. His chute didn't open.

Ten minutes, twenty minutes, thirty minutes, and still no letup in the attacks. The fighters queued up like a bread-line and let us have it. Each second of time had a cannon shell in it. The strain of being a clay duck in the wrong end of that aerial shooting gallery became almost intolerable as the minutes accumulated toward the first hour.

". . . we turned and headed for the Alps. . . ."

Our B-17 shook steadily with the fire of its 50s, and the air inside was heavy with smoke. It was cold in the cockpit but when I looked across at our pilot — and a good one — sweat was pouring off his forehead and oxygen mask. He turned the controls over to me for a while. It was a blessed relief to concentrate on holding station in formation instead of watching those everlasting fighters boring in. It was possible to forget the fighters. Then the top-turret gunner's twin muzzles would pound away a foot above my head, giving an imitation of cannon shells exploding in the cockpit.

His Shoes Came Off . . .

A B-17 ahead of us, with its right Tokyo tanks on fire, dropped back to about 200 feet above our right wing and stayed there while seven of the crew bailed out successively. Four went out the bomb bay and executed delayed jumps; one bailed from the nose, opened his chute prematurely, and nearly fouled the tail. Another went out the left-waist gun opening, delaying his chute opening for a safe interval. The tail gunner dropped out of his hatch, apparently pulling the ripcord before he was clear of the ship. His chute opened instantaneously, barely missing the tail, and jerked him so hard that both his shoes came off. He hung limply in the harness, whereas the others had showed immediately some signs of life after their chutes opened, shifting around in the harness. The B-17 then dropped back in a medium spiral, and I did not see the pilots leave. I saw it just before it passed from view, several thousand feet below us, with its right wing a solid sheet of yellow flame.

After we had been under constant attack for a solid hour, it appeared certain that our group was faced with annihilation. Seven had been shot down, the sky was still mottled with rising fighters, and target time was still thirty-five minutes away. I doubt if a man in the group visualized the possibility of our getting much farther without 100 per cent loss. I know that I had long since mentally accepted the fact of death and that it was simply a question of the next second or the next minute. I learned first-hand that a man can resign himself to the certainty of death without becoming panicky. Our group firepower was running low. Our tail guns had to be replenished from another gun station. Gunners were becoming exhausted and nerve-tortured from the prolonged strain, and there was an awareness on everybody's part that something must have gone wrong. We had been the aiming point for what seemed like most of the Lutfwaffe and we expected to find the rest of it primed for us at the target.

Fighter tactics were running fairly true to form. Frontal attackers hit the low squadron and lead squadron, while rear attackers hit the high. The manner of their attacks showed that some pilots were old-timers, some amateurs, and that all knew pretty definitely where we

were going and were inspired with a fanatical determination to stop us before we got there. The old-timers came in on frontal attacks with a noticeably slower rate of closure, apparently throttled back, obtaining greater accuracy than those that bolted through us wide out. They did some nice shooting at ranges of 500 or more yards, and in many cases seemed able to time their thrusts to catch the top and ball-turret gunners engaged with rear and side attacks. Less experienced pilots were pressing attacks home to 250 yards and less to get hits, offering point-blank targets on the breakaway, firing long bursts of twenty second, and, in some cases, actually pulling up instead of going down and out. Several FW pilots pulled off some first-rate deflection shooting on side attacks against the high group, then raked the low group on the breakaway out of a slideslip, keeping the nose up in the turn to prolong the period the formation was in their sights.

I observed what I believe was an attempt at air-to-air bombing, although I didn't see the bombs dropped. A patch of seventy-five to a hundred gray-white bursts, smaller than flak bursts, appeared simultaneously at our level, to one side.

Wheels Down

ONE B-17 dropped out on fire and put its wheels down while the crew bailed. Three ME-109s circled it closely, but held their fire, apparently ensuring that no one stayed in the ship to try for home. I saw Hun fighters hold their fire even when being shot at by a B-17 from which the crew was bailing out.

Near the IP, one hour and a half after the first of at least 200 individual fighter attacks, the pressure eased off, although hostiles were near by. We turned at the IP with fourteen B-17s left, two of which were badly crippled. They dropped out after bombing the target and headed for Switzerland. The No. 4 engine on one of them was afire, but the plane was not out of control. The leader of the high squadron received a cannon shell in his No. 3 engine just before the start of the bombing run and went in to the target with the prop feathered.

Weather over the target, as on the entire trip, was ideal. Flak was negligible. The group got its bombs away promptly on the leader. As we turned and headed for the Alps, I got a grim satisfaction out of seeing a column of smoke rising straight up from the ME-109 shops, with only one burst over in the town of Regensburg.

The rest of the trip was a marked anticlimax. A few more fighters pecked at us on the way to the Alps. A town in the Brenner Pass tossed up a lone burst of futile flak. We circled the air division over Lake Garda long enough to give the cripples a chance to join the family, and we were on our way toward the Mediterranean in a gradual descent. About twenty-five fighters on the ground at Verona stayed on the ground. The prospect of ditching as we approached Bone, short of fuel, and the sight of other B-17s falling into the drink, seemed trivial matters after the nightmare of the long trip across southern Germany. We felt the reaction of men who had not expected to see another sunset.

At dusk, with red lights showing on all of the fuel tanks in my ship, the seven B-17s of the group still in formation circled over Bertoux and landed in the dust. Our crew was unscratched. Sole damage to the airplane: a bit of ventilation around the tail from flak and 20mm shells. We slept on the hard ground under the wings of our B-17, but the good earth felt softer than a silk pillow.

In Aug. 1943 heavies of the 8th Air Force struck at Regensburg in the bend of the Danube.

USAF FLIGHT COMMUNICATIONS

By Capt. Joseph J. Duffy
Hq., Airways & Air Communications Svc., ATC

AIR FORCE Plan 62 is the simple and short reference to the USAF Military Flight Service Communications System. It is actually a communications system designed to provide the military services with the equivalent of the commercial airlines' "company business" facilities.

The system has been built around several focal points: the nine Flight Service Centers, located at Olmsted Field, Pa.; MacDill Field, Fla.; Wright Field, Ohio; Ft. Worth USAF; March Field, Calif.; Hamilton Field, Calif.; Lowry Field, Col.; Maxwell Field, Ala.; and McChord Field, Wash. Flight Service, ATC, is the organization which provides flight-following and advisory service to military aircraft, and is the agency through which clearances for take-off of military aircraft are obtained from non-USAF bases, or USAF bases at which there are no clearance facilities.

Prior to the installation of Plan 62, Flight Service functions were handled by military personnel stationed at the Civil Aeronautics Administration Air Route Traffic Control Centers located throughout the United States and using CAA communications facilities for the most part. Under the new system, established 1 November 1946, the military personnel are located at the nine Flight Service Centers, each of which controls an area corresponding to two or more Air Route Traffic Control Centers of CAA, and the communications facilities used are those of the Airways and Air Communications Service, ATC.

The Need

PLAN 62 was designed solely to improve the flying safety factor and it has already justified its existence. For example, under this Plan the whereabouts of every military aircraft flying, or about to fly in the U. S. is known to the proper authorities. When a plane departs from a base, a departure message is immediately dispatched to the field of destination. During its flight, it reports position periodically and receives pertinent weather reports and other information vital to the safety of the flight. Should the pilot for

Typical AACS Ground-Air radio station.

AACS section of a Military Flight Service (Plan 62) Communications Center.

any reason decide to change his destination, he requests approval from CAA or an AACS station, and the information is forwarded to Flight Service. As soon as the plane lands, a message is sent to its point of departure telling of its arrival. Under this Plan, therefore, the Base Operations Officer of the field of departure is spared much anxiety and is not called upon to set in motion the expensive machinery that goes to work whenever a plane is thought to be lost. For, once a plane has taken off, the Base Operations Officer is vitally concerned with its safety until he hears that it has arrived at another Base, and, if he were not informed by a timely arrival message, he would alert the Air Rescue Service and would start sending tracer messages to all logical fields and airports.

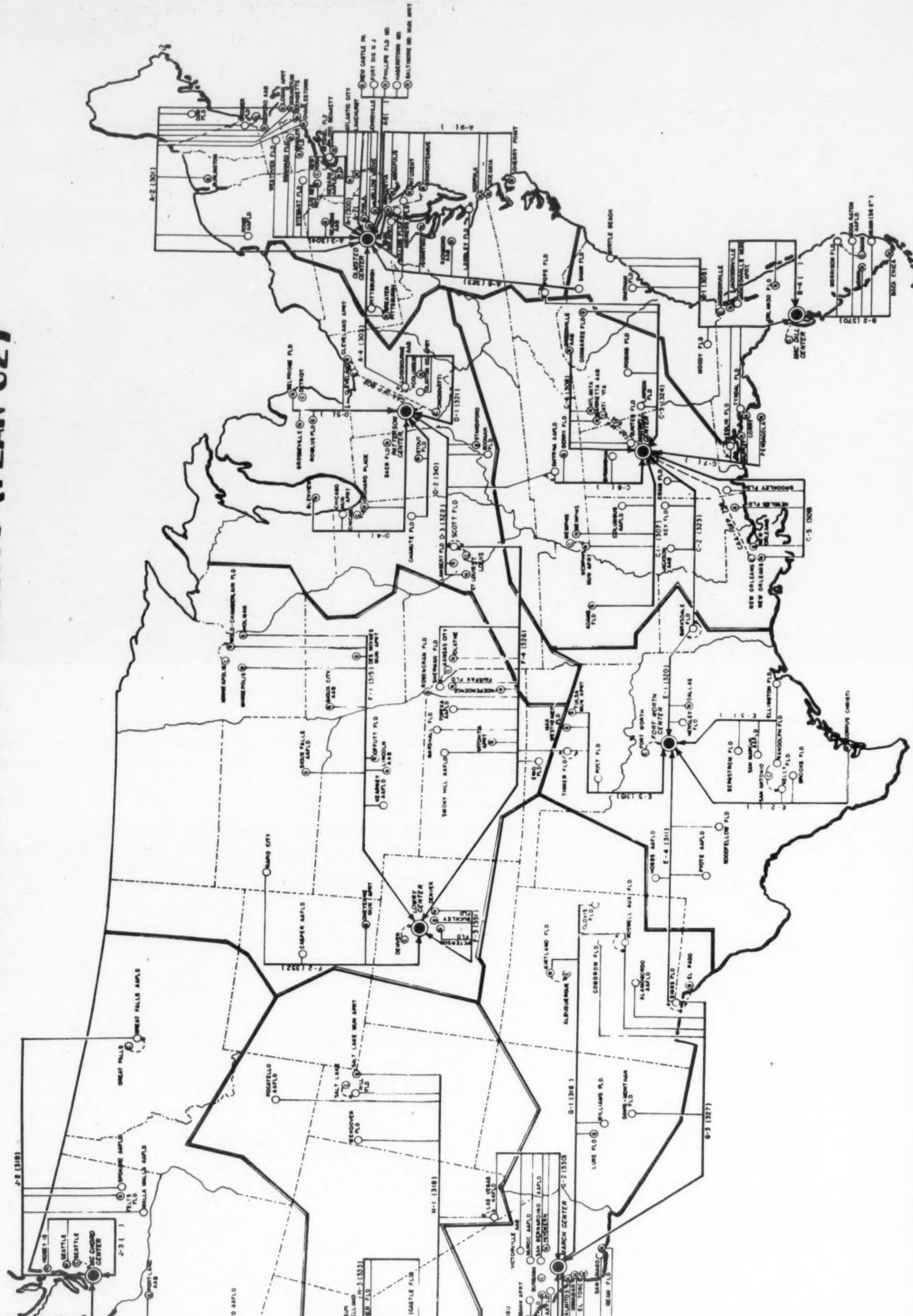
Detailed engineering of the USAF Military Flight Service Communications System was performed by the Air Materiel Command, Wright Field, Ohio. The Plan was implemented under the able supervision of Major J. P. Moran, the USAF Project Officer, and is constantly being analyzed and improved.

It should be borne in mind when considering Plan 62 that the Civil Aeronautics Administration is responsible for the control of aircraft under what has been designated as Instrument Flight Rules (IFR) conditions, and maintains Air Route Traffic Control Centers and a communications system to accomplish this objective. The facilities of the Military Flight Service Communications System (Plan 62) are intended to handle all traffic pertaining to flights of military aircraft under what has been designated Visual Flight Rule (VFR) conditions and to handle, in addition, numerous other "company business" operational traffic for the various military agencies connected to the system. However, provision has been made in the interphone system of Plan 62 for special circuits and switches which connect with CAA Air Route Traffic Control Centers in order that essential information concerning military aircraft and their flight under IFR (instrument) conditions, may be exchanged with the Civil Aeronautics Administration.

The Plan 62 system has combined in operation the services of the Airways and Air Communications Service, Flight Service and Air Weather Service. Its general mission is to provide point-to-point wire circuits, and ground-to-air radio communication facilities to military aircraft for the purpose of rendering flight dispatching, flight-following and flight-advisory services; i.e.: to furnish information of the movement of military aircraft to agencies concerned (from the point of departure to point of destination), including the various rescue and emergency agencies; to provide means of securing proper clearance for military flights from any bases where facilities are not available for the clearing of aircraft; and to provide means of coordination between CAA Air Route Traffic Control Centers and the military agencies for IFR flight traffic information.

Plan 62 provides the coordinating network for the Air Force's domestic aircraft operations

AACS INTERPHONE CIRCUITS (PLAN 62)



Communications Types

THE FOLLOWING types of communications are included in authorizations for traffic to be handled over the Plan 62 system:

a. Departure and arrival communications between USAF bases, including flight notices, departures, arrivals, warnings and delays;
b. Communications for functioning of Flight Service Centers, including flight messages;
c. Communications pertaining to emergency rescue matters;
d. Communications pertaining to hurricane evacuation and weather reconnaissance;
e. Aircraft position reports;
f. In-flight weather reports;
g. Weather forecasts, both route and terminal;
h. Other communications directly related to flight operations matters;
i. Operational traffic, such as all IFR clearances originated by the CAA for transmission to military aircraft;
j. Air evacuation messages.

The Military Flight Service Communications System (Plan 62) was designed to provide communications within and between nine separate geographical areas, encompassing the United States and designated as Flight Service Center Areas. The three services, namely: Flight Service, the principal user of the system; Airways and Air Communications Service, which operates the communications facilities; and Air Weather Service, which provides weather data, are found at each Flight Service Center. This Center is the control or monitoring point from which permission for flights, authority to change flight VFR plans, weather advisories and other data are relayed over the communications system to various terminals of the system or to aircraft in flight. Each Center is connected to every USAF base and certain Air Reserve and National Guard bases within its area by interphone circuits, with an average of six interphone drops per circuit.

From a communications standpoint, the interphone system is based on the following plan of operation: A group of stations (USAF Bases) are connected to a central point (Flight Service Center) by a common interphone circuit, with each station having a drop on the common circuit. One or more interphone circuits may terminate at the central point.

There are two types of stations, an outlying station (USAF Base) and a central station (Flight Service Center). The interphone terminations at the normal USAF base are located at the AACS Airways station, base operations and the control tower. Air Rescue Service squadrons and Military Air Transport Flight Supervisors' offices are also connected to this system at those USAF bases at which their units are located. The total number of bases at which the system is now installed is approximately 190. The number of interphone drops at each location varies from two to five.

In addition to the interphone system, each Flight Service Center is provided with a duplex automatic teletype circuit to the adjacent Center and is provided also with automatic reperforating equipment in order to facilitate the relay of operational traffic among the nine Centers. In the event of failure of certain teletype circuits, special switching arrangements have been made in the interphone system locations, so certain interphone circuits can be interconnected between Centers, thereby providing a secondary means of contact.

In order to provide communications between the Flight Service Centers and non-USAF bases to which military aircraft might fly, two additional means of communications are furnished. A Bell System TWX (Teletypewriter Exchange Service) is located at each of the nine Centers. Special long distance telephones are installed at each Center for the receipt of calls from pilots desiring clearance to take ofl from each non-USAF base.

Since there are two or more CAA Air Route Traffic Control Centers located within each Flight Service area, some means of communication between the two agencies are required. Where contact is not provided by a direct interphone circuit, arrangements have been made for one of the stations of a Plan 62 interphone circuit to switch through to a CAA Service F interphone circuit connecting to the CAA Center. In all cases, the Flight Service Center is able to use one means or the other to contact CAA with reference to the IFR flights of military aircraft. Present plans provide for the installation of additional interphone circuits which will connect the Flight Service Centers by direct interphone to CAA Air Route Traffic Control Centers within their respective areas.

Operational Methods

SINCE the activity of the Plan 62 communications system is dependent upon the number of flights of aircraft being made, a review of the responsibilities of the USAF pilots and radio operators toward the system will serve to describe the method in which Plan 62 fulfills its mission. The ground rules under which USAF pilots utilize Plan 62 are as follows:

a. *Departure from USAF bases.* In accordance with USAF Regulations 15-23 and 60-16. USAF Reg. 15-23 governs the accomplishment of USAF Form 23, which is fllled out by the Base Operations Officer and the pilot. Form 23 lists all information with regard to the pilot's intended flight, also including weather, detail of flight and names of passengers. USAF Reg. 60-16 lays down Air Traffic Rules and general regulations which govern the operation of USAF aircraft in the continental United States. It also specifies the weather conditions, air traffic and communication conditions under which USAF aircraft may fly.

b. *Departure from Non-USAF Bases.* Pilots of USAF departing from a non-USAF base will file a complete fligh plan with, and when necessary secure approval from, the nearest Flight Service Center prior to take-off, or as outlined in USAF Regulation 60-16. Communication with a Flight Service Center may be established by a collect telephone call. When a telephone is not available the nearest USAF base or AACS station may be contacted by radio. After obtaining the Flight Service approval, pilots contemplating flight under Instrument Flight Rule conditions will secure a CAA Airway Traffic Control clearance. The CAA clearance normally can be obtained more rapidly by contacting CAA direct through CAA communications facilities. However, if CAA communications facilities are not available, the CAA clearance may be obtained through Flight Service.

c. *Change of Visual Flight Rule (VFR) Flight Plan enroute.* USAF Aircraft requiring a change of route or point of first intended landing of a VFR flight plan enroute will contact Flight Service through an AACS airway radio station or control tower, submit the information required by USAF Regulation 60-16 and, when necessary, secure Flight Service approval.

d. *Change of IFR Flight Plan, or VFR to IFR, or IFR to VFR enroute.* Any USAF aircraft requiring a change of route, altitude, point of first intended landing, cruising speed, or alternate airport, or change from VFR to IFR, or IFR to VFR, enroute will contact a CAA communications station for CAA Airway Traffic Con-

Plan 62 Flight Service Area boundaries

trol clearance and Flight Service approval if necessary. Pilots possessing clearance authority must furnish Flight Service their new flight plan. If communication with a CAA communications station cannot be established, an AACS airway radio station will be contacted for coordination between CAA and Flight Service and to obtain CAA Airway Traffic Control clearance and Flight Service approval when necessary.

e. *VFR position reports.* When flying under VFR conditions, pilots will make position reports, wherever practicable, to AACS airway radio stations enroute and receive any necessary advisories from Flight Service. One position report each thirty minutes is considered adequate.

f. *IFR position reports.* When flying under IFR conditions, pilots will first make position reports to CAA communication stations as heretofore required by Civil Air Regulations, and then to AACS airways radio stations enroute, and receive any pertinent Flight Service advisories.

g. *Voice calls.* AACS airways radio stations will be called by the location name followed by the word "airways," such as "Bolling Airways." This is distinct from the CAA radio call system which uses the location name followed by the word "radio," such as "Washington Radio."

h. *Arrival reports at non-USAF Bases.* Arrival reports from fields where there is no established USAF Base Operations will immediately be sent by the most expeditious means available or by a collect telephone call to the nearest Flight Service Center.

i. *Remaining over night message.* At bases not connected with Flight Service Centers by military interphone, pilots may file RON messages via long distance telephone to the Flight Service Center at the time the arrival report is filed.

j. All VHF equipped aircraft are provided with a card to be prominently mounted near the VHF control box which will specify button, frequency and service obtainable. The following table displays the channels normally used to contact the various communications installations:

A	116.10 mc	CAA Airways (Range Stations)—AACS airways (Plan 62)*
B	126.18 mc	Control Towers
C	137.88 mc	AACS Airways (Plan 62)—Control Towers*
D	140.58 mc	Military emergency and GCA Final Approach Control

*Available for service indicated on secondary basis.

Procedure

THE GENERAL operating procedure in use in the Plan 62 communications system provides for the transmission of flight plans to the Flight Service Center for review and approval. In some cases, Base Operations Offices have clearing authority, and a copy of the approved flight plan is sent to the Center for information. The Airways and Air Communications Service performs the communications functions of the Flight Service Centers, and answers all telephone calls. At the present time when an outlying station desires to converse with Flight Service personnel, connection to Flight Service must be requested, inasmuch as AACS and Flight Service functions are conducted in separate rooms within the Center. However, each Center is being equipped so AACS and Flight Service may be signalled individually by controlling the duration of the ringing signal.

Typical example of flight plan transmissions on the interphone circuit follows: (Below each quotation, in italics, is a plain language interpretation.)

Langley Field Operations Office has a flight plan for the Olmsted Cen and has just signaled the Center, which answers:

"Olmsted Center."
This is Olmsted Center answering.
"This is Langley Operations, flight plan."
This is Langley Field Operations Office. I have a flight plan to transmit.
"Go ahead."
Go ahead, transmit flight plan.
"USAF eight eight five seven, B twenty five, Jones, from Langley CFR to Patterson Field, two one, four four nine five, VFR channel C, departed zero nine one five Eastern, two zero zero, six zero zero hours of fuel, three two, AG"
United States Air Force aircraft, identification number 8857, type B-25, pilot's name Jones, flying in accordance with visual flight rules, to Patterson Field, from Langley, air speed 210 knots per hour, radio transmitting frequencies to be used during flight are 4495 kc and 137.88 mc, departed from Langley Field at 0915 Eastern time, estimated time en route is two hours, fuel for 6 hours flight aboard, pilot's rating is 3-2, a USAF pilot, (over 500 hours), interphone authorized a white instrument card operator's initials are AG.
"JP, one eight."
Interphone operator's initials are JP, the time of receipt of this flight plan is 18 minutes past the hour.

Communications pertaining to jet aircraft (because of their speed), aircraft crashes, overdue and missing aircraft, hurricane evacuation and reconnaissance reports, and Air Rescue Service operational messages are given special handling and priority of transmission when requested.

For an example of how the system works, assume that Lt. Doe wishes to fly from a small military airfield in the March Field area to another small military field in the Ft. Worth area, under VFR (Visual Flight Rules) conditions. Lt. Doe files a flight plan at his base operations office, and approval for the flight is received by Plan 62 interphone from the March Field Center.

Appropriate weather advisories are furnished with this approval. When Lt. Doe takes off from his base, the Base Operations Office notifies the March Field Center, which relays Lt. Doe's complete flight plan over the express teletype circuit to the Ft. Worth USAF Center. The Ft. Worth Center takes this message and relays it via the Plan 62 interphone system to the Base Operations Office of Lt. Doe's destination. As Lt. Doe proceeds on his flight, he reports by radio to AACS airways stations, which relay his position to the March Field Center, and also relay weather or airfield advisories to Lt. Doe if requested to do so by the Center. In other words, the Flight Service Centers are "keeping an eye on" Lt. Doe's flight.

When Lt. Doe lands at his destination, he files his arrival report to Ft. Worth Center by interphone for a relay via teletype and interphone back to the station from which he took off. In this case, there were no unforeseen occurrences to interfere with the flight. However, if unusual weather conditions had arisen during the course of his flight, the Flight Service Center within whose region he was flying at the time would have originated a message to him, and relayed it over the Plan 62 interphone system to the AACS Airways station nearest his position for transmission to him in flight. This advisory would warn him of the unforeseen weather, advise him to proceed to an alternate airport, or such other appropriate information. If at this time Lt. Doe wished to proceed to his original destination, or some other destination, and the flight required a CAA Air Route Traffic Control approval, the AACS Airways operator could obtain this for him over the interphone system by contacting the Flight Service Center which would obtain the clearance, or in some cases, by contacting CAA directly, through a conference switch at the Center.

In this manner the departure, progress and arrivals of all military flights are continually being flashed over this network of interphone circuits, and the teletype circuits connecting the nine centers. In addition to providing the above services, pilots in flight are given additional information concerning weather, field conditions, radio aids to navigation, direction finding assistance, and miscellaneous route information.

The next step in the development of the system is the addition of approximately fifty Naval Air stations into the interphone network. Detailed plans having been completed, the facilities of the nine centers are being increased and existing and new circuits are being extended and rearranged, in order to integrate the Naval Air stations into the system. It is expected that within several monhs the Plan 62 system will be able to provide in full for Naval aircraft the same service it is now furnishing the United States Air Force, Air Reserve, and Air National Guard aircraft.

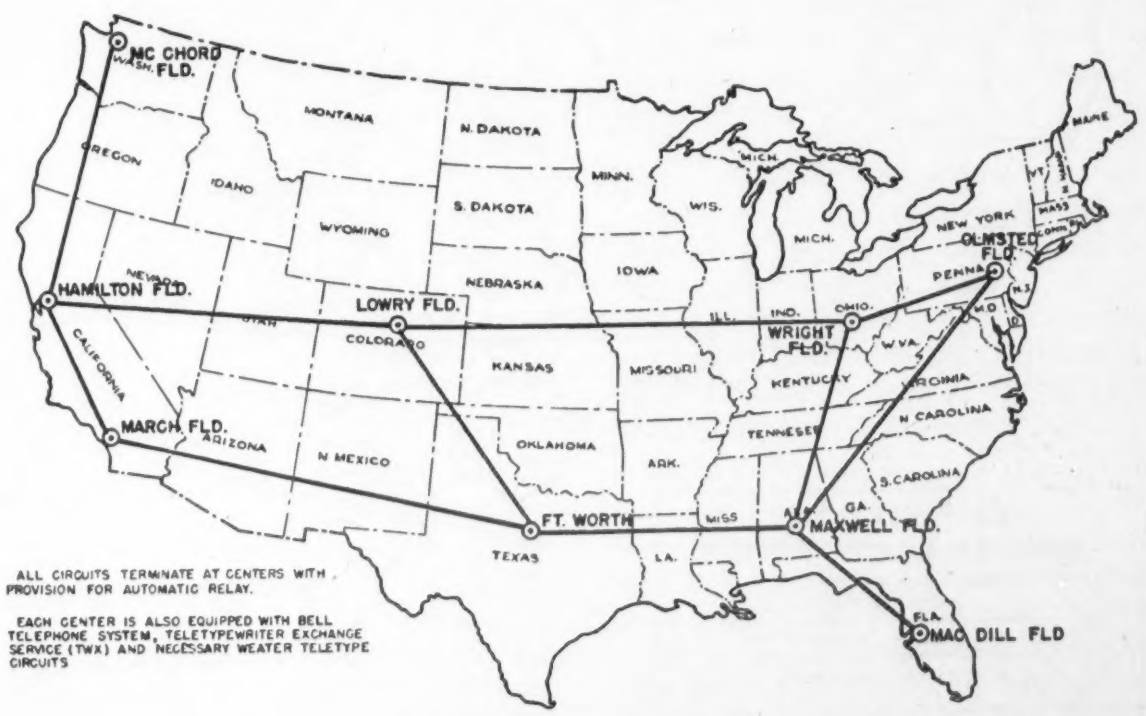
Equipment

AT EACH of the nine centers, the interphone circuits terminate in key equipment, with multiple positions which appear before the AACS communications positions, the Flight Service dispatchers and coordinators positions, and the Air Weather Service. There is normally a total of seven or more positions in the Center from which calls may be initiated or answered. Voice recording equipment is installed, to provide a permanent record of conversations on all interphone circuits.

The ground/air communications system which is utilized as the medium for conveying communications from and to military aircraft is the Airways and Air Communications Service. Sixty ground/air stations, so located as to facilitate USAF flights, use and continously guard the frequencies, 116.1 mc., 137.88 mc., and 140.58 mc., which correspond respectively to Channels A, C, and D in military aircraft. 137.88 mc is the AACS Airways frequency, 116.1 mc is CAA Airways frequency, and 140.58 mc is a joint Army-Navy Emergency frequency. Of these sixty-five stations, forty-six also use and continuously guard on 4765 kc, the Plan 62 AACS Airways voice channel. In addition, twenty-three of these stations operate on 8200 kc c.w., and 4595 kc c.w., in addition to other frequencies reserved for special purposes of various users of the AACS facilities. These stations are all located at USAF bases and at each station is a drop on the Plan 62 interphone system, in addition to those at the control tower, operations office, or other location.

The equipment used at the outlying stations consists of loudspeakers for monitoring all transmissions, a telephone hand set which disables the loudspeakers when lifted, and provisions for ringing the central station, as each multi-drop circuit terminates in telephone key equipment having ring-down lamp signals. In some cases, provisions are made for connecting the multi-drop interphone circuit at a selected switching point to a CAA-SVC-F interphone circuit or to another Plan 62 multi-drop interphone circuit which extends to the adjacent Center.

The equipment wsed at the central station (Center) consists of telephone key equipment with visual and audible ringing indication and associated handsets. The key equipment has multiple appearances so several operators can handle the circuits appearing therein. Other local circuits connecting Air Transport Command Flight supervisor offices, Air Rescue units, etc., are also terminated in the telephone key equipment. Provision in the key equipment is made for the connection of voice recording equipment. Civil Aeronautics Administration circuits terminating in telephone key equipment at Centers are capable of "conference connection" with any USAF interphone circuit terminating in the same Center. Since each Center is divided into two sections, the AACS Communications



Plan 62 teletype circuits.

Section and the Flight Service Section, each circuit appears in both the AACS and Flight Service rooms, and normally the AACS communicator is able to receive the incoming calls and flash the operator in Flight Service to come in on the circuit when required. Since Air Weather Service forecasters are usually located in the same or an adjacent room to Flight Service, the appearance of the circuits at Air Weather Service is normally limited to one operating position. Leased wire circuits are high grade four-wire voice circuits.

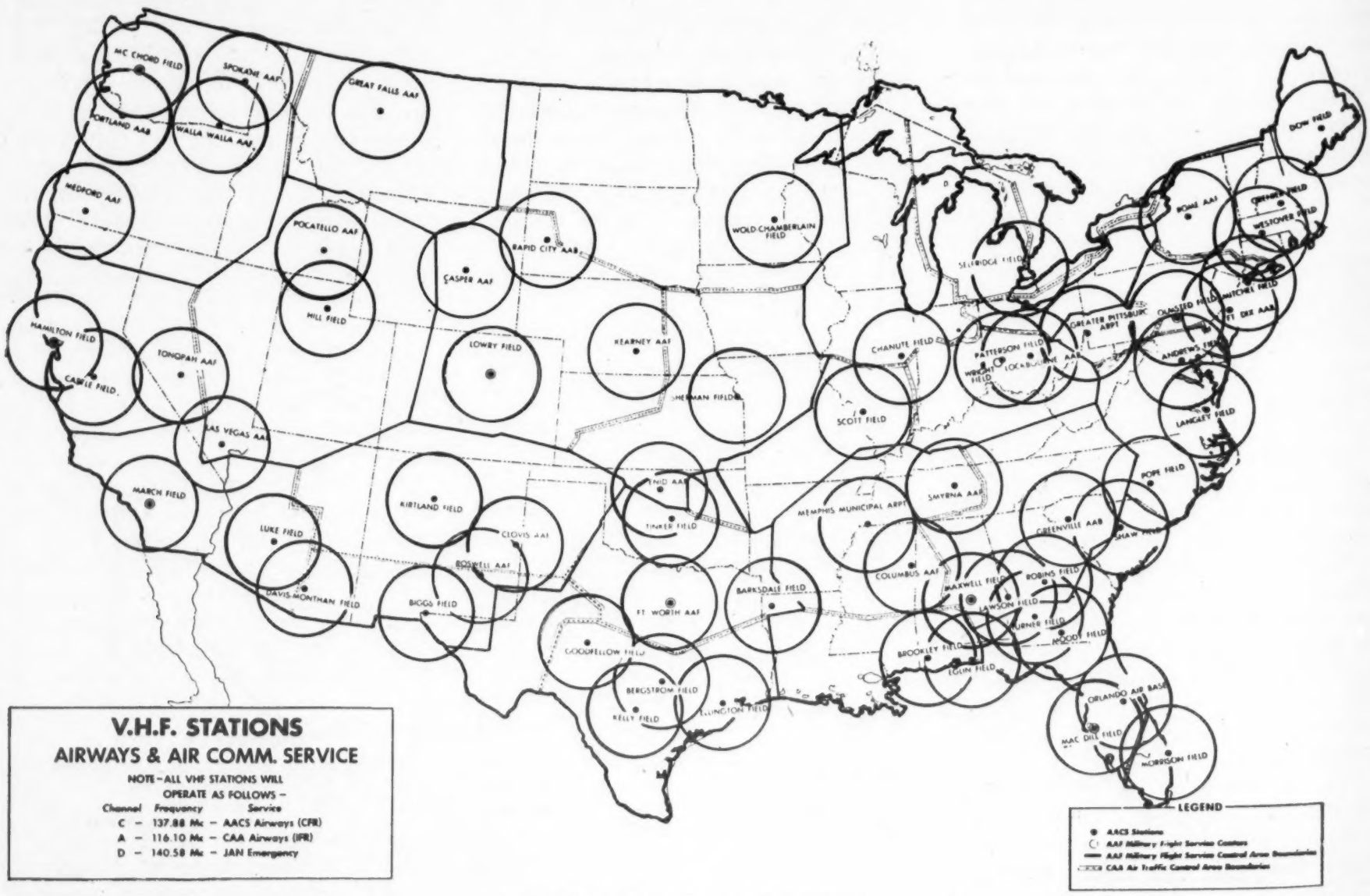
As previously stated, at certain outlying interphone stations, it is sometimes necessary for an interphone circuit to be switched into a CAA Service F interphone circuit so the Flight Service Center, or possibly some Base Operations Office on the interphone network, can effect coordination concerning IFR (Instrument) flights of military aircraft. Provisions are now being made at approximately 17 locations, at which a CAA Air Route Traffic Control Center and a Plan 62 interphone station are located at the same airfield, for a special dial signalling arrangement which will enable any station on the Plan 62 interphone circuit to call the dial signalling station and have the Plan 62 circuit dialed through into any desired section of the CAA Air Route Traffic Control Center. This is being accomplished by extending the Plan 62 interphone circuit into the telephone key equipment of the CAA Air Route Traffic Control Center, disconnecting the visual signal normally associated with the circuit, and installing a local dial signalling circuit between the key equipment in the CAA Air Route Traffic Control Center and the interphone installation at the local Base Operations Office or AACS Airways station, whichever is designated as the dialing point. Isolation of the visual signal circuit in the key equipment at the CAA Air Route Traffic Control Center is necessary to prevent false signals when outlying military bases are ringing the key equipment at the distant military Center.

The teletype equipment used on the duplex circuits interconnecting the Centers, and terminated in the AACS communications section of the Center consists of the required number of model 19 teletypewriters, model 15 teletypewriters, and 133-A subset typing reperforators.

The sixty-five ground/air stations are composed of a transmitter station, a receiver station and a message or operating center. The majority of the high frequency transmitters are 400 watt, four-channel transmitters, using doublet antennas. In some cases, where additional coverage was required, three-kilowatt, four-channel transmitters were used. The VHF transmitters are single-channel and are installed on the basis of three in operation and one for standby. All transmitters are controlled remotely from the operating center.

The receiver site is generally located at a distance of several miles from both the transmitters and the operating center. These sites were picked for their lack of man-made noises and adequate antenna space. Standard Super-Pro receivers are used for high frequency reception, and the BC-639 type for the VHF frequencies. At some locations, it was necessary to combine the receiver site and the operating center, which, with four operating positions, controls the transmitters and the receivers.

Plan 62 has now been functioning long enough to demonstrate its efficiency. Since its inception, it has greatly facilitated the flight of military aircraft and has resulted in marked operational improvement. Complementing the existing means of communications, its continued use will serve to maintain and increase the high safety factor of military aviation in the United States.



AACS VHF Ground-Air radio stations.

WHITE HOUSE SIGNAL TEAM

By Major George J. McNally

Chief, White House Signal Detachment

THE SIGNAL officer on wartime duty in Accra, on Africa's Gold Coast, was mystified by the sudden arrival of a sergeant on secret orders who firmly requested top-priority service. Operations officers in such remote way stations as Georgetown, British Guiana, or heat-ridden Khartoum in the Anglo-Egyptian Sudan, had similar doubts about A-1 priority travel orders carried by close-mouthed officers and enlisted men who would not state their missions or destinations. Prime Minister Churchill, too, had reason to wonder at the fleetness of these men who unobtrusively appeared at Quebec, Teheran, and Yalta — wherever grand strategy was planned and historic policies formulated during the war years.

To these men — members of the White House Signal Detachment— was entrusted the mission of speeding the President's top-secret communications, from highest level conference tables to installations in the field. Today, wherever the President travels, the White House Signal Detachment continues its task of weaving deftly an intricate communications net which enables the Commander-in-Chief to keep himself constantly informed and in touch with the Nation.

Activation

ALTHOUGH officially activated in March 1942 by orders labeled "immediate action" and "secret," the White House Signal Detachment had its informal inception weeks before, when Lt. Col. William A. Beasley of Fort Monmouth, New Jersey, received orders to report to the White House. In a session with Frank J. Wilson, then Chief of the United States Secret Service, and Michael F. Reilly, in charge of the White House Detail, plans were formulated to provide the President with complete communications coverage. Brig. Gen. Frank E. Stoner, Chief of Communications, told Colonel Beasley, "You're working for the President. He is to have everything he needs and it must be the best." Supplied with an A-1-A priority and funds for procurement and purchase of non-issue equipment, Colonel Beasley undertook the job of fighting time with speed.

News from Europe and the Orient was anything but reassuring. An attack was expected. How or where was not clear, so all contingencies were anticipated. Elaborate safety precautions were established for the President's protection. A bombproof shelter was begun at the White House.

The White House Signal Detachment travels with the President in w ar and peace. (left) Gen. Giraud and De Gaulle with Pres. Roosevelt and Churchill at Casablanca. (center) Prime Minister MacKenzie King joined in Quebec talks. (right) At Teheran Generalissimo Stalin conferred with ubiquitous Roosevelt and Churchill.

A guard of Fifth Cavalry troops from Fort Myer was thrown around the White House grounds; cameras were taboo; and special passes were required for admittance. Helmets and gas masks were issued all around, and every one on duty took gas defense training.

Beginning with a nucleus of men detached from the Washington Provisional Brigade, Colonel Beasley in December 1941 set up a signal shop and began organizing a radio network to supplement and possibly replace the telephone system, in case enemy bombs crashed down. The main radio control was located in the White House itself, with five net stations of 50 watts each at strategic centers in and near Washington. The main transmitter and antenna were remotely controlled. In addition, an emergency 50-watt set, powered by a diesel unit which automatically cut in when commercial power failed, was set up on the White House grounds. A low frequency transmitter, also in the White House, served as the master control for a handitalke (SCR 536A) net used by the military police and Secret Service men. A fleet of Secret Service cars and a few MP vehicles were equipped with mobile 30- and 50-watt two-way radios, and additional receiver pick-up and transmitter control points were set up.

A private branch telephone exchange board, separate from the White House switchboard, was also installed. Tie lines ran to key centers in Washington, with private lines to persons the President might wish to summon in emergencies. Direct lines ran also to all sources of air raid warnings.

With his own plans laid and the Joint and Combined Chiefs of Staff functioning, President Roosevelt plunged into international arrangements. Prime Minister Winston Churchill came over for a conference. Princess Martha of Norway arrived and took up residence outside the District. The Signal team installed a small radio station and a private branch telephone exchange at Lee, Massachusetts, where Queen Wilhelmina elected to stay for the summer of 1942.

President Roosevelt soon resumed his trips to Hyde Park, and the Signal Detachment took action to provide additional communications. A 50-watt frequency modulation station was modified and installed on the Secret Service car attached to the Presidential train. Army vehicles, radio equipped, were spotted at strategically plotted points along the route between Washington and Poughkeepsie, so that the train was in constant touch with the White House all the way. Another FM radio link was installed in the old stable on the President's estate at Hyde Park. By means of a direct telephone line to Washington and frequency modulation radio, the White House was kept informed of the President's whereabouts at all times.

For security reasons, men of the Signal Detachment dressed in civilian clothes. Arrivals and departures of the Presidential party were made at late and early hours, to prevent crowds. However, appearance of familiar cars and personnel on the roads and in the vicinity of Poughkeepsie was the tipoff. Probably not more than a few thousand persons knew of the movements. The press stuck faithfully to their agreement and merely reported that the President had not held the usual press conference or that he could not be reached for comment.

President Roosevelt met Chiang Kai Shek at Cairo (left). Failing health had taken its toll before the Yalta meeting (right).

Railroad Car 1401 was converted for communications. This is manual radio operating position.

Shangri-La

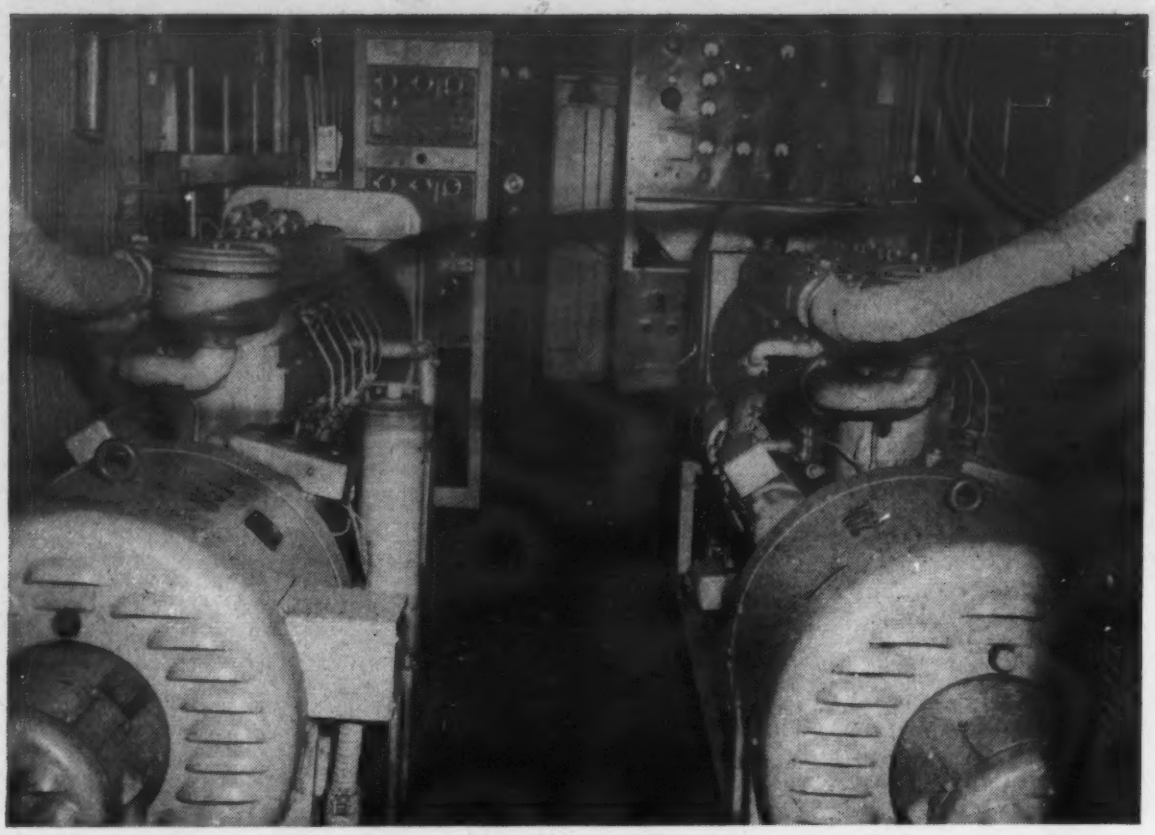
THE PRESIDENT later sought respite in a mountain retreat, closer to the District of Columbia. The camp, formerly a summer place for children, had been turned over to the military. To the Marine guards, the Navy maintenance personnel, the Secret Service and the Signal Corps men, the area seemed to be a proving ground for bad weather—an area where it rained continuously, "one day from the sky and two days off the trees." The mountain itself was like solid rock, and when the time came to lay telephone cables, blasting was necessary. Crews from Army headquarters in Baltimore sweated over cables and equipment that alternately got water soaked or burned out when storms hit the mountain. The elements had a high regard for President Roosevelt, though, and he enjoyed many good days at the mountain lodge. The haven was named by the President at a press conference. When asked where he had been, he smiled and said, "Shangri-La."

In spite of long-range planning and the complete support of the Signal Corps, a slip-up almost did occur. One afternoon at Shangri-La, a call came from the President's lodge, "Mr. Hopkins wants to listen to Hitler's speech!" Soldiers were dispatched to locate a short wave radio in camp. They returned without success. Among the great variety of radio equipment on hand, nothing was immediately available for short wave broadcast reception. Finally, in one cabin a table-style broadcast receiver was found. A quick check revealed a short wave band. The switch was thrown and the set tuned. German speech issued from the speaker. With ten minutes to go, two soldiers quickly strung an antenna outside the Roosevelt lodge. A third soldier polished the battered radio cabinet, and another made certain that the tuning control was not touched. Then, tenderly, the set was carried to the President's study where it was plugged in. The "Boss" and Mr. Hopkins listened while a stenographer recorded the frenzied phrases. This attribute was noteworthy about the White House official family—they never questioned our means of carrying out an order or request so long as it was accomplished.

Top-flight plans, intimate correspondence, and war strategy discussions among President Roosevelt, Prime Minister Churchill, Generalissimo Stalin, General Eisenhower and many others were encoded and decoded by the enlisted men and officers of the Signal Detachment with never a slip. The responsibility was heavy, but it is on record that no enlisted man of the White House Signal Detachment failed in a crisis or was derelict in his duty.

As the tempo of war activities increased, the manual coding and decoding of the heavy traffic to and from the President's desk proved too slow. Sixty-word teletype printers with cryptographic attachments were

Born in Brooklyn April 18, 1906, Major George J. McNally is a Dodger baseball fan. After New York and Brooklyn public schools, attended Notre Dame briefly. Interested in radio since Ford spark coil days. Held both amateur and commercial licenses. Tried Merchant Marine and news reporting. Joined U. S. Secret Service in New York, 1935. Assigned to White House with outbreak of war and worked with Signal Corps on security communications. Joined Army in summer 1942 and stationed at White House until April 1945. Overseas as counterfeiting expert in ETO with Quadripartite Control Group. Worked with Scotland Yard on German counterfeiting during war. Back in U.S. March 1946; returned to Secret Service in Chicago. Resumed active duty status as Commanding Officer, White House Signal Detachment under the Military Aide, General Harry Vaughan.



Transmitter and Teletype converter section, Car 1401. Diesel power units in foreground.

installed at Hyde Park and in the Map Room of the White House. Similar equipment was carried and installed everywhere the President traveled.

Army and Navy personnel manned the Map Room where the latest war information from all over the world was plotted. The President and his staff inspected these maps daily, and here many military and naval plans were germinated. The White House communications center was run by the Combined Staff, while the White House Signal Detachment handled operations in the field.

In May 1943, Colonel Beasley, the commanding officer, left the outfit and prepared to go overseas; and Major Dewitt Greer took command of the Detachment. In the Signal Detachment shop, work went forward in adapting equipment to specialized tasks. Signal equipment was mounted in saddle bags on motorcycles, with a speaker on the handlebars and a throat microphone for transmission. Police-type 35-watt radios were installed in jeeps and station wagons. Metal detectors were designed and built for Secret Service use. Miniature receivers and transmitters were adapted and improved. A special broadcast set was constructed for the President's use. In the continuous race to develop new, better, or more efficient methods, nothing was spared. Field crews were out constantly on surveys to test equipment or locations for optimum results.

Railway Hq.

AS EARLY as May 1942, in preparation for the President's tour of the country, the Signal Detachment was ordered to prepare a railroad car as a mobile radio station. A combination coach and baggage car, Number 1401, was secured by the Transportation Corps and work began; to meet the standards of the American Association of Railroads, extensive modifications were necessary. Seven inches above the roof was the maximum space allowable for tunnel clearance; so antenna wires were strung inside insulated tubing and mounted on porcelain high tension skirted insulators parallel to the roof. A fireproof double-walled tank with a pump feed was built underneath the car to supply the gasoline power units which ran the transmitters. Among other items of radio equipment, Car 1401 carried a dual channel 500-watt transmitter, a 250-watt FM transmitter-receiver combination, and a 75-watt transmitter for emergency use. After shakedown trials, the generators were converted to diesel power, and the 500-watt generators were increased to 2 kilowatts. By further modifications, the static and vigration apparent in the early trials were minimized. Thereafter, wherever the President traveled on the North American continent, to Canada, to Mexico, and to the west coast, Car 1401's facilities enabled the Commander-in-Chief to call the signals to the world-wide military team.

When the President's train put in on a siding at Georgian Bay, Ontario, in advance of the Quebec Conference in August 1943, Car 1401 was the mobile powerhouse which furnished rectified power for the train batteries, pumped water and air for the cars, and provided constant radio communications to station WAR in Washington. Field telephones were strung for the sentries, and frequency modulation radio was used between the train and small boats when the President fished.

At the staid Chateau Frontenac at Quebec, where the conferees assembled, a Signal Center was installed, with full duplex teletype conference circuits and additional telephone facilities provided. Telephone cables were festooned around the outside of the hotel. At the Citadel, the fort where the President and Prime Minister Churchill conferred, the Signal Detachment set up and operated the communications facilities for the President and his staff.

The speed and efficiency of United States Army Signal Corps equipment was never better demonstrated than at Hyde Park during Prime Minister Churchill's second visit. In a test of speed, the Prime Minister and the President sent identical messages over British and United States facilities to Australia. The President had his answer in less than two hours; the Prime Minister got his the next day. Again, in Canada, the Allied staff had difficulty believing that the coded answer which came from General MacArthur over a conference circuit had come so swiftly over such a great distance. Over the same conference circuit, decisions were reached which moved up the day of reckoning for the Japs.

Teheran

IN PREPARATION for the Teheran conference, Signal Detachment personnel leap-frogged ahead of the President, alerting personnel at various points, setting up radio and telephone channels and moving on. With the locale of the conference held secret until the last minute, strange situations developed as a result of detachment personnel globe-hopping with A-1 priority travel orders. To get the network functioning, one officer made a record trip to his post in Asmara, Eritrea, where a relay station was set up; and another officer and enlisted man traveled to Cairo, Egypt, in 76 hours, bucket seats all the way.

The conference which began at Teheran was continued in the shadow of the Pyramids. When the conference broke up, a trek was made across North Africa, stopping at General Eisenhower's headquarters in Tunis. The President flew to Malta, then to Casablanca, where he boarded a ship for home.

In the summer of 1944, President Roosevelt, Prime Minister Churchill and the Combined Staffs again met at Quebec. General Stoner super-

vised the installation of communications facilities at the Chateau Frontenac, with the White House Detachment handling the President's private communications.

To attend the meeting of the Big three at Yalta, the President traveled by ship through submarine-infested waters. From aboard the *U.S.S. Catoctin* off Yalta on the Black Sea, the Signal Office rushed equipment into position ashore; and the Detachment again swung into action. Communications were ferried to the Naval station for transmittal. In mid-February, when the agreements were concluded, the travel-tested men of the White House Signal Detachment headed homeward with the Presidential entourage.

In addition to setting up temporary installations at conference sites, the White House Signal Detachment, as early as 1943, operated fixed radio stations in Washington, Baltimore, Philadelphia, New York and Shangri-La. Regardless of trips and conferences, communications developments went on. With the cessation of hostilities, the Detachment could view with satisfaction the number of "firsts" compiled in the course of duty: first to construct and operate a long-range mobile radio station in a railroad car with high powered equipment; first to design and develop pocket-size metal detectors; first to design and develop pocket-size frequency modulation radio transmitters and receivers; first to keep a United States President in 24-hour communication from any point on the North American continent to any point in the world where United States personnel were stationed.

White House communications traffic dropped in volume at the end of the war, but one thing remained apparent. It was impossible or at least impractical to return communications to a pre-war status. First of all, peace treaties were not signed, so a state of war still existed technically; second, it was felt that Presidential traffic should not have to return to the limited facilities formerly employed, for the armed services channel still far exceed the commercial in many places. Third, the proven wartime security of the traffic should be retained.

The number of personnel in the White House Detachment has dropped to a peace-time level but since the need remains, equipment is still maintained with a view to tomorrow or next month or even next year. Plans are still made far ahead. Parts are on order, ideas are put up and discussed, the Signal Corps is queried on possibilities. Need and adaptability are the constant questions and the answers lie in the field and shop; in tests, rebuilding and adapting and more tests until the need is filled.

The field of operations of the Detachment has not lessened appreciably since war days. There are increasinly fewer places around our shrinking globe that the 'Short Snorters' of the outfit have not been. Recent trips by President Truman to Ottawa, Mexico City and Rio de Janeiro have continued to tax the ability of the organization to 'Get it done'.

On the Ottawa visit the railroad communications car handled the traffic both ways. In Canada, the advance group had set up the local service and a 24-hour basis was established once the party arrived. To Mexico City and Rio, the President travelled by air and the planes were tracked to their stops. Meanwhile the advance party had arranged for message handling at the intermediate points and final destination. When the President boarded the USS *Missouri* at Rio for the return, the Navy took over control and joint facilities were employed.

Radio teletype, radio-telephone on a variety of reserved frequencies, high frequency FM, VHF and land line are all used, according to the need. These systems are the communications officer's way of assuring the President of the United States that on land, sea or in the air, at home or abroad, he need never want for fast, accurate and secure message handling.

As the officer stands or falls by the efficiency of his men, so the White House Signal Detachment has stood by the complete cooperation of all. If sometimes startling results have been obtained it has been because from the Chief Signal Officer down, everyone has contributed in some measure to success. The Office of the Chief Signal Officer has often smoothed the way and removed terrific obstacles. Various units of the Army have cut tape and in other ways aided the sometimes sorely pressed White House personnel to achieve a result considered impossible in the same time it would have taken for the difficult. A goodly measure of assistance came from, and still does, another behind-the-scenes group. This is the section that handles cryptographic material and equipment. Top secret traffic depends on them. Hardly a branch of the National Defense group has failed to play a part in speeding Presidential traffic on its way.

Much credit is due the commercial companies also for the speed and efficiency with which they installed and supervised equipment usually on short notice and often under severe handicaps.

On the occasions when the President has stayed on a Navy vessel or rested at a Navy station, unification of service facilities was immediate and complete.

With a flexibility acquired in world-wide service, the White House Signal team is continuing to apply the lessons of wartime experience to the problem of maintaining communications channels wherever the Commander-in-Chief travels.

Radio Teletype installation in Car 1401.

ASSOCIATION AFFAIRS

ARMY SIGNAL ASSOCIATION

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1st Vice Pres.: Wm. J. Halligan
2nd Vice Pres.: Darryl F. Zanuck
3rd Vice Pres.: A. W. Marriner
Counsel: Col. F. W. Wozencraft
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New Name

In the past weeks members of ASA have voted on the choice of a new name to show that our Association will now function in the common interests of all three Armed Forces. After a study of the ballots our Directors have narrowed the choice to "Armed Forces Communications Association" and "American Military Communications Society." The final decision will be made by our directors and will be announced not later than January 1, 1948.

Program for 1948

Nationwide Influence: Build up the Association among the three Armed Forces, and the civilians who support them, to not less than 15,000 members, stressing the lessons of military preparedness to all the American people.
Annual Meeting: Assemble our members at one or more centers of development of military communications or photographic equipment for the study of the latest techniques; preferably, this year, at an Air Force establishment.
Chapters: Increase their number and keep our members and the public informed of Armed Forces photographic and communications needs through the program activities of the local Chapters. Call on these Chapters, as needed, to supply advice on problems submitted by the armed forces to the Association.
National Advisory Committees: Increase their number and scope, as needed, and submit specific problems on all phases of manufacturing and operations to them for study, report and recommendations for procedures in military or industrial planning.
Publications: Inform our members and the public, through our publications—the bi-monthly SIGNALS and periodic Bulletins—on all current national defense problems, with particular reference to communications and photography.
National Headquarters: Render full assistance, through an adequately staffed Washington headquarters, to our local chapters and national advisory committees in planning and conducting their activities in conformity with Association objectives.
Employment Service: Expand for the use of communications and photographic personnel a professional service for the placement of qualified persons in industry and government.
Liaison: Continue close contacts with all education, scientific, military and industrial institutions for united action regarding preparedness for the national defense.
Industrial Preparedness: Bring home to all of our people the need for industrial preparedness as one of America's strongest guarantees of peace.
Personnel: Assist in developing and maintaining a catalogue of personnel trained in specialties essential to communications and photography, which might be available to our Armed Forces in an emergency.
Editorial: By editorial comment in our publications, and other means, to encourage adequate military training throughout the United States and the upbuilding of strong civilian components as an integral part of the defense team.

CHAPTERS

Decatur

On 16 October, before an audience of approximately 70 members and guests of the Decatur Chapter, Dr. Clarence E. Ireland, Chief Physicist of the A. E. Staley Co., spoke on the historical development of nuclear energy. Dr. Ireland explained the theory of the atom from its first discovery through the years to the atom bomb. Included on the program was a showing of the Department of the Army's color film of the Bikini atom bomb tests.

This was Decatur's second scheduled meeting in the Fall series, which was opened on 18 September with an address by Colonel Frank Kidwell, 5th Army Signal Officer, whose speech on communication problems in the African and Italian campaigns was enthusiastically received by the group. And on 13 November the Chapter members will gather to hear

CHAPTERS and Secretaries

BALTIMORE: Col. Arthur Pulsifer, Sig. Sec., Hq. 2d Army, Ft. Meade, Md.

BOSTON: Capt. F. P. Singleton, Boston Army Base, Boston 10, Mass.

CHICAGO: Raymond K. Fried, 111 West Monroe St., Chicago 3, Illinois.

CLEVELAND: Capt. F. G. Harris, Rm. 703, 820 Superior Ave., N. W., Cleveland, Ohio.

DECATUR: Mr. E. C. Whitcomb, RR 6, Box 263, Decatur, Ill.

EUROPEAN: Col. W. A. Beasley, OCSigO, USFET, APO 757, c/o PM New York.

FORT MONMOUTH: Dr. Virgil Payne, 400 Atlantic Ave., Long Branch, N. J.

NEW YORK: Lt. Col. F. H. Fay, 32 Ave. of the Americas, New York, N. Y.

OGDEN-SALT LAKE CITY: Miss Marjorie R. Hansen, M-4 Bonneville Pk., Ogden, Utah.

PHILADELPHIA: G. O. Peters, Plant Engr. Agency, 17th & Sanson Sts., Philadelphia, Pa.

PITTSBURGH: Capt. J. J. McGovern, 434 Beverly Rd., Pittsburgh, Pa.

SACRAMENTO: Lt. Col. C. H. Melvin, Jr., Sacramento Signal Depot, Sacramento, Calif.

RICHMOND: Miss Jean Melton, Ches. & Potomac Tel. Co., 703 E. Grace St., Richmond, Va.

ST. LOUIS: Henry C. Hughes, 8506 Stanford Ave., St. Louis, Mo.

WASHINGTON: Capt. H. E. Fisher, 2824 Devonshire Pl., N. W., Washington, D. C.

STUDENT CHAPTERS:

OKLAHOMA A & M: W. L. Covel, Mil. Dept., Okla. A & M College, Stillwater, Okla.

TEXAS TECH: Rush D. Robinett, Mil. Science Dept., Texas Tech. College, Lubbock, Texas.

UNIVERSITY OF CALIFORNIA: R. G. Barhite, Bowles Hall, Univ. of Calif., Berkeley, Calif.

Mr. Paul V. Galvin, President of Motorola, Inc., one of ASA's Directors.

Ft. Monmouth

Approximately 150 persons, representing the 187th Signal Group and the Ft. Monmouth Chapter of ASA, held a joint meeting at Ft. Monmouth on 30 September. Colonel Paul L. Neal, SCEL, presented the subject: "Basic Communication Circuit Plan," which is the foundation of the post war Signal research and development program. General Lanahan, commanding Fort Monmouth, was present and briefly addressed the meeting. Major Louis W. Pflanz showed excellent colored movies of native life, taken while he was stationed in India. Additional joint meetings will be held on the last Tuesday of each month.

New York

At the annual meeting of the New York Chapter on 15 October, Maj. Gen. Spencer B. Akin presented a contemplated long-range program for the Signal Corps. Short talks were given by Generals Ingles, Mauborgne, Colton, Lanahan, and Admiral Redman.

General Akin stated, "This Signal Corps program . . . consists of long-range scientific planning, research and development to provide the finest communications equipment and the fastest communications techniques and systems possible. And, of course, to make available for all using elements an adequate quota of Signal communications experts known for their high level of training, skill and ability to get the message through."

He further said that "It is encouraging to all of us in the Signal Corps that the Army Signal Association, through its Board of Directors, has appointed several standing committees to implement the purposes of the Association, and to explore all avenues of cooperation between it and the Signal Corps. I am advised that these committees now have under consideration seven problems from the Army, three from the Navy and Air Force, and one from the Munitions Board. I can assure you that the counsel and decisions of these committees will be carefully considered, as will any recommendations covering the adaptation of civilian techniques for national defense purposes.

"One of our major current objectives in the Signal Corps . . . is the building-up of our Organized Reserves, and the establishment of closer and more direct contacts with the individual Reservist.

"In the period of twenty years between World War I and World War II the Officer Reserve Corps decreased from 200,000 to 6,000, and this," General Akin emphasized, "is of great significance when we project our present Reserve Officer strength of about 500,000 to twenty years in the future."

General Akin pointed out that "plans for our post-war Army have fully considered these lessons of World War II. If these plans mature, the Organized Reserve will contain full strength units fully trained and ready for mobilization. These plans also provide for a reservoir of officers with military service who will be eligible for assignments for which they are qualified by experience and capabilities."

General Akin also stressed the necessity for positive legislation providing for Universal Military Training, and outlined the benefits of such training, quoting from the Report of the President's Advisory Commission on Universal Training.

General Akin read a letter he had received from a Signal Corps Reserve Officer who voiced several pertinent convictions in which the general also concurred: "He pointed out that there are many experienced Signal Corps officers, now returned to civilian life, who are anxious to be of service to the Signal Corps. Further, he said, that unless some means is provided to keep these officers engaged in some form of military activity, they will lose interest, and their greatest potential usefulness not be realized.

"This officer then went on to suggest that Reserve Officers participate in the planning and implementation of various Signal Corps activities on an inactive duty status. General Akin told the New York Chapter that the Signal Corps would welcome suggestions, regarding Reserve participation in Signal Corps activities.

The general then discussed the industrial plan for preparedness. He stated that ". . . in formulating our industrial mobilization program we have developed methods of determining our needs more accurately. We are analyzing our equipment to measure what materials are required, and in what quantities, in order that critical materials may be included in the stockpile. We are selecting manufacturing plants on which we can rely in the event of another emergency. And we are paying particular attention to those small component parts, such as electron tubes, capacitors, batteries, and quartz crystals, which were in such short supply at the outbreak of the last war."

Calling attention to ASA, General Akin then stated: "Historians are agreed that one of the outstanding characteristics of our war effort was the close cooperation between all branches of the government and the industrial, scientific and social agencies of the Nation. A major part of our attention must be given to the further building-up of this coopera-

National Advisory Committee Chairmen

GENERAL MANUFACTURING: Mr. F. R. Lack, V. P. in charge Radio Div., Western Electric Co.

BATTERY MANUFACTURING: Dr. George W. Vinal, Bur. of Standards, Wash., D. C.

DRY BATTERY SUBCOMMITTEE: Mr. Ralph E. Ramsay, V. P. & Research Director, Ray-O-Vac Co.

STORAGE BATTERY SUBCOM: Mr. L. E. Wells, Chief Engr., Willard Storage Battery Co.

COMMUNICATION EQPT. MFG.: Mr. F. R. Lack

RADIO MANUFACTURING: Mr. F. R. Lack

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MILITARY TRAINING: Major. Gen. G. L. Van Deusen (Ret.)

PUBLICITY: Mr. Roland C. Davies, Telecommunications Reports,, Wash. D. C.

tion in days of peace. One of the most effective mediums I know of for maintaining this study is the Army Signal Association.

"At this time I wish to stress also the splendid opportunity that is offered associations such as ours in serving as a connecting link between our armed forces and the general public. Local Chapters can be especially helpful in interpreting our needs and problems in the many communities where members are leaders, or active participants, in the industrial, professional, and social life.

In closing, General Akin warned, "We must leave nothing undone toward the end of giving our national security the finest, fastest and most secure communications possible. With your help, and the help of others who know how vital is this mission, we are bound to succeed."

With the conclusion of the principal address, the officers for the ensuing year were announced: President, Brig. Gen. A. W. Marriner; 1st and 2nd Vice Presidents, Col. Thomas R. Putnam and Brig. Gen. S. M. Thomas; Secretary, Lt. Col. Frank H. Fay; Treasurer, Major T. N. Pope; and the following 12 directors—Col. F. P. Andrews, Mr. G. W. Bailey, Brig. Gen. C. O. Bickelhaupt, Col. G. P. Dixon, Lt. Col. W. L. Hallahan, Maj. Gen. H. C. Ingles, Mr. D. W. G. Palmer, Lt. Col. E. R. Shutefi Maj. Gen. F. E. Stoner, Col. Morton Sultzer, Lt. Col. Allen L. Whitman, Col. P. C. Sandretto.

Pittsburgh

Adding to the growing Chapter list, the Pittsburgh petition, filed on 14 October, was accepted anf formation of a Chapter authorized. Although the program for the year has not been completed, on 18 November officers were announced as a result of an election held 16 October. These results were too late for this issue of the magazine.

The Pittsburgh group believes in the personal contact for building membership; each member contacts a friend before the scheduled meetings.

Sacramento

Sacramento Chapter has held two meetings this Fall, and is planning another in November. On 16 September some 80 people gathered at the Senator Hotel for the first dinner-meeting of the year. Mr. W. G. Stone, Director of the Sacramento-Yolo Port District, discussed the Sacramento deep-water channel project now becoming a reality. Mr. Stone stressed the military value and relationship to such activities as the Sacramento Signal Depot and the commercial benefit to the city of Sacramento.

Brig. Gen. C. H. Arnold, Chief, Signal Corps Procurement and Distribution Division, spoke, representing the Chief Signal Officer. Attendance at the meeting included a wide representation of Sacramento's business, industrial and Army groups. Brig. Gen. C. B. McDaniel, commanding Mather Field, was present with a large contingent from Sacramento's two air Bases, Mather and McClellan Fields. Others represented the Pacific Tel. & Tel. Co., Pacific Gas & Electric, the electrical industry, the Chamber of Commerce, city government and business at large.

A committee was appointed to nominate the regular Chapter officers. Following an election of 13 October, the following were named: President, L. J. Brundige; 1st, 2nd and 3rd and 4th Vice Presidents, M. G. Mauer, H. H. Crow, H. N. Skidmore, H. B. Bronner; Treasurer, E. N. Crippen; Exec. Secy., G. H. Melvin, Jr.; 1-yr. Directors, R. D. Livingston, W. E. Doyal, H. W. Johnson, 3; 2-yr. Directors; J. V. Hicks and Paul Carrington; and 3-yr. Directors, R. R. Alexander and G. H. Brereton.

Dr. Otto J. M. Smith, of the University of California, spoke on the atom bomb.

St. Louis

From Col. G. E. Popkess, Jr., comes the report of a meeting held 27 October at the Mark Twain Hotel for the formation of a St. Louis Chapter. Col. Popkess stated that personnel from the Signal Corps, Officer's Reserve, and area enlisted detachments, attended. The presence of manufacturers and industry men made a well-rounded representation for the initial meeting. The Charter Presentation ceremony was held 24 November.

Salt Lake-Ogden

The first Salt Lake-Ogden meeting was held 29 October, with representatives of the telephone company and utilities present. The Charter for the Chapter was presented and a membership drive launched.

Seattle

Colonel Tully has given us further information on the Coast Army-Industry Day held at Ft. Lewis, Wash., on 12 September. Over 500 leading industrialists of the Pacific Northwest met under sponsorship of seven military associations to hear a first-hand report on industry's present relationship to the national security program, as presented by a prominent group of Army representatives. Gen. Mark Clark addressed the meeting on the Austrian situation. Ohter speakers were Maj. Gen. H. A. Aurand, director of the new Research & Development Division; Maj. Gen. Emmett O'Donnell, Air Force Director of Information; and Lt. Gen. J. L. Collins, new Army Deputy Chief of Staff.

South America

Down in Rio de Janeiro, Colonel G. P. Dixon, of I.T.&T., reports the formation meeting of the South American Chapter on 25 September.

Richmond

Some 200 persons attended the fourth meeting of the Richmond Chapter on 28 October, in the auditorium of John Marshall High School. They heard Maj. Gen. Ernest N. Harmon, wartime commander of the famed Second Armored Division, describe his battle experiences. Military and civic leaders from Richmond and Washington were prominent in the audience.

Your enjoyment climbs to new altitudes through radio and television achievements of RCA Laboratories.

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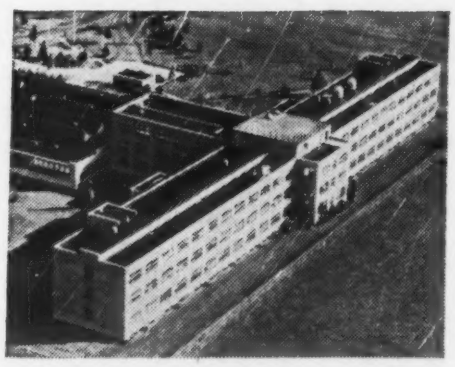
In other fields of radio-electronics, RCA has pioneered major achievements—including the electron microscope. Research by RCA Laboratories goes into every product bearing the name RCA or RCA Victor.



RCA Laboratories at Princeton, N. J., one of the world's centers of radio and electronic research. • When in New York City, see the radio-electronic wonders on display at RCA EXHIBITION HALL, 36 West 49th Street. Free admission. Radio Corporation of America, Radio City, New York 20.

RADIO CORPORATION of AMERICA

A.S.A. News

Baltimore

Over 475 members and their guests were present for the Fall meeting on 27 October at the Middle River Depot to hear Maj. Gen. Leslie Groves, director of the atom bomb project during World War II, deliver a stirring address. Prior to the dinner, those present witnessed a well-planned and thoroughly interesting demonstration of equipment and the activities of the Signal Depot, prepared under the direction of Col. Watts, Depot Commander. Col. Pulsifer, Chapter Secretary, expects a large increase in Chapter membership as a result of this meeting.

Boston

At the chapter formation meeting held 30 October at the Parker House, General Sherrill, Executive Secretary of ASA, outlined the objectives of the Association and its new mission of serving Army, Navy and Air Force. Lt. Col. G. T. Gottle presided at the meeting, which was arranged by Col. Paul Hannah. Dr. J. A. Stratton, MIT, a member of the ASA Board of Directors, also spoke. Capt. F. E. Suchard was elected President and Capt. F. P. Singleton, Secretary.

Cleveland

A report of the 13 November meeting did not reach National Headquarters in time for this issue. Chapter President Lee Shaffer, former Signal Corps colonel at Ft. Monmouth and Alaska, presided. Feature speaker was Brig. Gen. W. O. Reeder, Deputy Chief Signal Officer and war time Commandant of the Signal School at Ft. Monmouth and Signal Officer in China and Burma. Gen. Reeder was to speak about his war-time experiences in the Far East.

European

On 14 October the Charter of the European Chapter was sent to Col. E. W. French. Brig. Gen. Jerry V. Matejka states that they intend to make this the outstanding Association Chapter.

Univ. of California

Norman B. Newcomb, President of this student Chapter, called the first Fall meeting to order on 9 October. Highlighted by a series of demonstrations of modern communications equipment, the climax came when Brig. Gen. David Sarnoff, National President of Army Signal Association, spoke by telephone from New York City. He complimented the Chapter on having the first winner of ASA's ROTC honor award, Dale Nielsen, and strongly urged the formation of a local ASA Chapter in the San Francisco area. He said, further, that he hoped the University of California would take the lead in re-establishing the Signal Corps ROTC fraternity, Pi Tau Pi Sigma, inactive since the War. General Sarnoff's message was fed into an amplifier and public address system so the entire group of approximately 65 students and their guests could hear the speech and the conversation between the general and Mr. Newcomb.

The meeting, which was designed largely to attract new members to the ASA student Chapter from among the college student body, then continued with a demonstration of the mobile telephone system developed by the American Telephone and Telegraph Company. Mr. Merle Walther, of A.T.&T.'s San Francisco office, described the operation of the system and then demonstrated its function by placing a call from the meeting room to a company car cruising in the vicinity of the University. The demonstration car stopped at the University after the call was completed for inspection by the audience. The meeting then adjourned to another room in the Military Department of the University, where the Signal Unit had arranged an exhibition and demonstration of military communication equipment.

Dale E. Nielsen, Cadet Colonel of the Unit, was presented with ASA's scroll in recognition of his academic and leadership ability—the first ROTC student to receive the Award since its inception. At California's November meeting new officers will be elected.

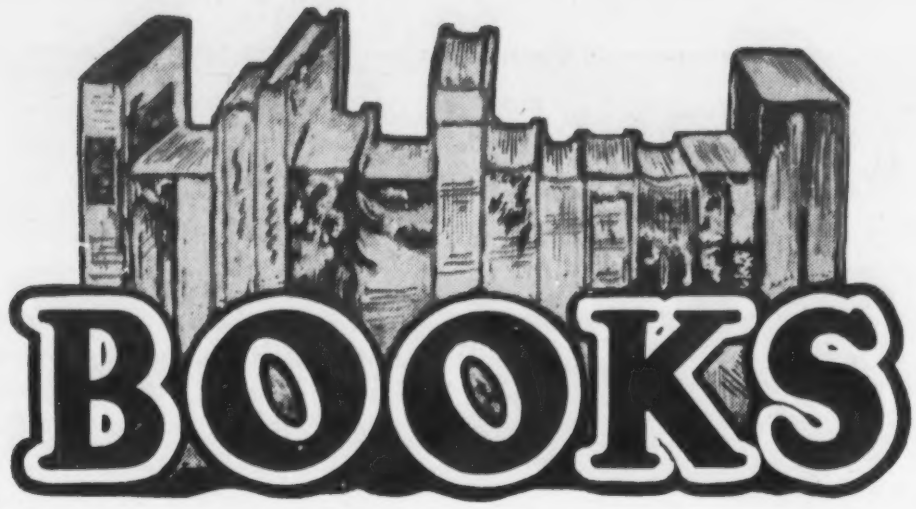
Midwest Army-Industry Day

Lt. Col. B. I. Noble, Lincoln Tel. & Tel. Co., has been designated to represent ASA at the Industrial Preparedness Day, Friday, 12 December, at Omaha, Nebraska. Gen. Mark Clark will be the speaker in a meeting similar to that held in Seattle on 12 September.

Executive Committee

Details of action taken at the quarterly meeting of ASA, held in Chicago in November, will be reported in the next issue of SIGNALS.

Norman B. Newcomb, Student President of the Univ. of Calif. Chapter of ASA, speaking to Assn. Pres. David Sarnoff. Dale Nielsen holds scroll presented him by ASA for academic and leadership ability.



LUCKY FORWARD—Story of Patton's Third Army, by Robert S. Allen. 402 pages, illustrated. Vanguard Press. $5.00.

AMERICANS who served in the Third Army—or read of its exploits—will find "Lucky Forward" intensely interesting. Its style is that of the "Washington Merry Go Round" which Robert Allen, the author, wrote with Drew Pearson for many years.

Whatever else one may think, it does emphasize the fact that General Patton, the hero of the book, possessed one of the most essential qualities of a military leader—the creation and maintenance of loyalty to him by his subordinates. In the eyes of Allen, who was on General Patton's staff, the general could do no wrong. If any of our other military leaders opposed his ideas—and of course they did—he gives them no credit for doing so because of a desire to employ a different plan to win the victory, but insists that they only disapproved of General Patton's plans at the time because of jealousy or dislike. He quotes Patton as stating when he took command of the Third Army that the President and General Eisenhower demonstrated their confidence and did not "believe a lot of god damned lies that have been printed about me." He refers, of course, to the much publicized soldier slapping incident.

Allen gives high praise to all members of the Third Army staff—which he considers the most brilliant of any Army staff. He is inclined to credit it as the only capable staff in any Army. Since we are communications-minded, it especially interests us to read his praise of the Third Army Signal Officer, "Demon" Hammond, asserting that the "chunky, insatiably curious West Pointer was constantly called on to perform miracles and he never failed."

The reader soon become conscious of Allen's loyalty, which approaches the ridiculous. He finds no fault with anything any member of Third Army did and has little but criticism, ridicule and contempt for all other military leaders — American and British — not only in the combat area but in the supply services and in the Chiefs of Staff at home. One gets the impression that all the worthwhile, brave, brilliant officers and men somehow got into Third Army and practically no one worthy of commendation or esteem served elsewhere. A very biased account of the exploits of a great military leader and a great fighting army. SHS

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OPERATION VICTORY, by Maj. Gen. Sir Francis de Guigand. 474 pages. Charles Scribner's Sons. $3.75

THIS book, by Field Marshal Montgomery's Chief of Staff from the time he assumed command of the Eighth Army in North Africa until VE Day, presents, in what very definitely is a fair and unbiased way, the operations in which our forces in Africa and Eu- fought side by side with the British.

Montgomery has been a controversial figure since he first came to prominence early in the war. General de Guigand present the point of view of a fair-minded British soldier and gentleman. He undertakes to explain (rather half-heartedly) Montgomery's tendency to "play it safe" and not take risks as many of the American commanders were willing to do. It was surprising to learn that Montgomery did not bother to attend the Supreme Commander's conferences either in England or on the Continent. He always sent his chief of staff to represent him, except on one occasion. This procedure seems inexcusable for a subordinate presumed to be giving full and unquestioning support to his superior commander. According to the author, Montgomery felt that, if Eisenhower wished to see him, he could find him at his (Montgomery's) headquarters.

The author speaks admiringly of Patton several times and states that he could sense his great love of the American fighting man; describes in interesting fashion the action before, during and after the Battle of the Bulge; and tells of his admiration for Bradley, against whose armies the German attacks had been launched. He praises the restraint and spirit of fair play of the British press, which he says hardly ever, by their attitude, embarrassed the British commanders, which "is more than can be said about the press of America."

Every campaign is made clear to the general reader, with a generous use of map. No student of the history of World War II should fail to read this book. SHS

COLORADO, by Louis Bromfield. 263 pages. Harper & Bros. $2.75.

IN THE heart of Colorado's magnificent, towering mountains, between Denver and Leadville, lies Silver City, a cattle and mining town, ruled by P. J. Meany. P.J. is the wealthiest man in the town, therefore he dominates all who come in contact with him. He owns the gigantic hill-top house, a few mines and grazing land in the valley.

Into this wild city come four people from the east: Dick, P. J.'s youngest son, who has spent some time at Oxford, acquiring the polish of a gentleman; Cecil, Dick's English tutor, who is constantly amazed by the land and people so different from his own country; and, Madamoiselle da Ponti, a rather beautiful, self-reliant young singer, chaperoned by a downbeaten gambler who is known as the "Professor." What happens to these four in Silver City is a tale full of action that hold's one interest throughout the book.

Though these four are the center of interest in this Western city, there is Mrs. Meany, who is not quite so weak as P. J. thinks; their huge daughter, whose one eccentricity is sending portions of the Holy Scriptures to convicts in the State penitentiary; the two wild elder sons, who raise havoc in the town —particularly on Saturday nights at the El Dorado, the largest gambling house, run by a blonde proprietress, friend of P. J.

Colorado's bonanza mining days are brought to life in this boisterous novel. Here is the graphic portrayal of the heyday of Silver City and its inhabitants, expertly done by the renowned writer, Louis Bromfield. DVM

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SPEAKING FRANKLY, by James F. Byrnes. 316 pages. Harper & Bros. $3.50.

SELDOM has a book been charged with such explosive and intensely controversial material as these memoirs of our first post-war Secretary of State. As a Justice of the Supreme Court, Director of Economic Stabilization, Director of War Mobilization, and State Secretary from July 1945 until January 1947, Mr. Byrnes was intimate with the shaping of our foreign and domestic policy for six chaotic years. He relates his experiences with nothing approaching a literary style but with a forthright manner that quickly captures reader confidence.

Mr. Byrnes has exposed the innermost secrets of the recent conferences, beginning with the Yalta meeting and continuing through every important conclave for the next two years. He purports to answer such questions as: How did Molotov commit "a major diplomatic blunder" which "marked the turning point of the war"; what did Byrnes say to President Truman preceding Wallace's resignation as Secretary of Commerce; What did Stalin say when told about the atomic bomb; Had

FDR become disillusioned about the Soviets before he died; What is it like to negotiate with the Russians on a formal—and often highly informal—basis; and a host of others.

The Russians as opportunists, as obstructionists and masters of the hard bargain, are presented by a bitter man —one who approached his task with as much resolution and fairness of mind as possible, but came away from Yalta, Potsdam, the Foreign Minister meetings and the first peace conferences convinced that the Soviets do not want an early settlement of the peace. There are candid character sketches and racy narrative passages that, for the first time, enable the lay reader to look behind the scenes where the men who control the world meet around the conference table. Much of World War II history and the disintegration of Russo-American relations following the victory come clear in the the light of Byrnes' revelations.

This is a book of international importance, one that may have a profound effect on our future foreign policy. Already it has been placed on the proscribed list and Byrnes branded as a "war monger" by the Red press. "Speaking Frankly" examines the most serious question facing a war-weary world with complete candor and a burning trenchancy. While Mr. Byrnes does not hold that peaceful cooperation with the Soviet State is impossible, he does paint a dour picture. He recommends the submission of occupational problems to the United Nations in the event of further procrastination in the conclusion of a German peace treaty. As a last resort, he advocates force in driving the Red Army from the Eastern German provinces.

"Speaking Frankly" poses a direct challenge to the moral fortitude of our statesmen; as such, it cannot be ignored. HJW

•

END OF A BERLIN DIARY, by William L. Shirer. 369 pages. Alfred A. Knopf. $3.50.

DEFEATED Germany requires a firm but understanding policy if Europe is again to establish a stable economy. But William Shirer, noted correspondent and radio commentator. can find little of cheer in the rubble of the Third Reich.

A sequel to the parent volume, this book chronicles Shirer's activities from the latter days of the war to the Spring of 1947. It is written in diary form and presents the reactions of a sensitive mind to the enormity of the thing that was Nazism.

The book is thoroughly documented with direct quotations from captured Nazi papers, trial records, and secret testimony that make fascinating reading for the history student. This is excellent source material and is annotated in such a manner that the text does not become tiring.

Shirer reveals the manner in which the Nazi hierarchy functioned. He reports top secret war meetings in which Hitler outlined his military plans, often in violent contradiction to the wishes of his generals. He describes the internecine strife, the maniacal jealousies and rivalries that motivated the madmen who perpetrated the greatest crimes in human history.

"End of a Berlin Diary" is not a pleasant book. It does not advocate the soft peace for Germany, nor does it admit that the Nazis could have retained power without the tacit and passive cooperation of the mass of the German people. Those who would shift all blame for the war crimes to the party leaders will not like the opinions expressed by Mr. Shirer, who speaks German well and mingled with the people after his return to the Fatherland. He can only report that the Germans dislike Hitler, not for starting the war, but rather for failing to win the victory. There does not exist in the German mind the capacity, or the willingness, to properly appraise the true guilt.

Shirer devotes considerable space to the Nuremberg trials, which he covered for the radio. There is excellent material on a judicial event without parallel in legal history. Finally, he closes with an examination into the present, the dreariness of the future—"Yet a returning reporter remembered so many things . . . the monumental apathy of the German people and . . . their whining complaints at the lack of food and fuel and their total lack of sympathy or even interest in the worse plight of the occupied peoples, for which they bore so much responsibility; their boredom at the very mention of the Nuremberg trial, which they were convinced was only an Allied propaganda stunt; their striking unreadiness for, or interest in, democracy, which we, with typical Anglo-Saxon fervor and blindness, were trying to shove down their throats." HJW

THROUGH arrangement with the publishers, your Book Department is now able to offer a special price for the Second Edition of "Reference Data for Radio Engineers," Federal Radio's standard handbook that has found widespread acceptance in the trade, on the laboratory workbench, in the "ham" shack, and the university classroom.

The book has been thoroughly revised and expanded to 336 pages, with over 400 illustrations, charts and diagrams. Chapters on transformers, room acoustics, radio propagation and radio noise have been rewritten with special emphasis on post-war developments. Data on cathode-ray tubes has been considerably revised because of the tremendous interest in television, radar, and laboratory techniques. This is full coverage of radio-from Ohm's Law to Bessel's Functions.

"Reference Data" has been enthusiastically received in the trade, the colleges and the industry. More than 75,000 copies have now been sold and the edition has gone into a second printing. It is strongly bound and can withstand severe handling.

Although the book lists at $2.00 for a single copy, Association members may purchase it for $1.80 for a single copy, or $1.44 in lots of twelve or more. The book is available for immediate delivery through our Book Department.

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PRESIDENT Truman's Advisory Commission on Universal Military Training recently submitted an exhaustive and comprehensive report on the subject to the Chief Executive. Because the document in 446 pages in length, it is not likely that it will be widely ready by the public.

Realizing the timeliness of this material, the "Army Information Digest" recently reprinted officially approved extracts from the report, outlining the salient point without extraneous material. UMT is likely to be an explosive subject in the next Congress, the 1948 elections, and in the military preparedness of America. We recommend that our members secure copies of this valuable tract, which is available from the Book Department, Army Information School, Carlisle Barracks, Pennsylvania.

The booklets sell for 10¢ each, 12 for $1.00, 25 for $2.00, and 100 for $5.00. Send your orders, with remittance, directly to Carlisle Barracks, where they will be given prompt attention. Cash should not be mailed in first-class envelopes and stamps are not acceptable.

Our Book Department can furnish, in limited quantity, any book currently in print. We will also help you to secure older titles that you may need to complete your library. A 10% discount is allowed all Association members on orders of $10 or more. Please indicate author and publisher where known, and allow at least three weeks for procurement and delivery.

SIGNAL CORPS NEWS
FROM THE CHIEF SIGNAL OFFICER

Affiliated Units

Major General Spencer B. Akin, Chief Signal Officer, announced recently that several major organizations in the communications and manufacturing industries will cooperate with the Signal Corps in the formation of selected trial units in the Affiliated Signal Corps Reserve.

The participating agencies are: the American Telephone and Telegraph Company, the General Electric Company, the Graybar Electric Company, the International Telephone and Telegraph Corporation, the Radio Corporation of America, and the United States Independent Telephone Association.

Under the proposed program, special service type units will be thoroughly trained for any future emergency with a minimum waste of time, effort and manpower. It is further provided that technically qualified personnel would be utilized in assignments similar to those they perform in civilian industry. The trial units will be selected by the cooperating and participating organizatons as representative of the groups they expect ultimately to sponsor in the overall Signal Corps program.

Experience with the proposed trial units is expected to serve industry as a guide in the expansion of the affiliation program and to aid in determining the number, types and location of the many additional units contemplated by the Signal Corps.

General Akin has stated that "Generally, these new trial units are to be located in the First Army area (eastern U.S.), so they will be near the home offices of the companies concerned, and so top officials can keep in close touch with their progress."

The affiliation program is not new since in both world wars business and industrial concerns sponsored various types of such units. In the Signal Corps alone, 295 units were activated for communications and related activities, a large proportion of which came from the Bell System and the nation's Independent telephone companies. A majority of the units served overseas and compiled notable war records in and out of combat.

Mobilization

That the Signal Corps is counting heavily on the cooperation of industry in the successful operation of its industrial mobilization program was made evident by Brig. Gen. Calvert H. Arnold, Chief, Procurement and Distribution Division, OCSigO, in a recent speech.

Reminding industry that it holds the "biggest stake in any industrial mobilization plans," General Arnold continued:

> "We hope to be able to place contracts with experienced manufacturing companies for planning studies on essential items of equipment with which production difficulties were experienced during the past war but which were never solved.
>
> "We are trying to perfect methods of determining our needs more accurately so we will be better able to tell industry what we want; we are analyzing our equipment to find out what materials are required and in what quantities, in order that critical materials essential to communications and electronics equipment may be included in the Army and Navy Munitions Board stockpile of materials."

New Personnel Chief

Colonel Marion Van Voorst, former Executive and Chief of the Administrative Office, Office of the Chief Signal Officer, has been assigned as Chief, Personnel and Training Division. He succeeds Colonel Frank C. Meade, who has been retired at his own request to become associated with the Automatic Electric Company of Chicago.

Colonel Van Voorst was graduated from the United States Military Academy in 1918. He attended the Coast Artillery School, the Signal School and Yale University between various assignments in the United States and in Panama. During the war, as a brigadier general, he was Assistant Military Attache at the London Embassy and, earlier, Chief of the Intelligence Division, Office of the Chief Signal Officer.

Chairman

Colonel Fred W. Kunesh, Chief, Industrial Mobilization Branch, Office of the Chief Signal Office, has been named Chairman of the Army-Navy Munitions Board Committee on Communications and Electronics Equipment. The initial objective of the Committee is to determine the capability of industry to produce the quantities and categories of equipment needed in an emergency.

Food Committee

Signal Corps communications facilities were utilized recently in Assisting President Truman's Food Committee. A 225-word Committee message was sent from the Pentagon Building to mayors of 1,072 municipalities. These messages were sent to twelve re-file stations from which they were transmitted commercially.

Delegate

Dr. Harold H. Beizer, radio engineer at the Signal Corps Engineering Laboratories, was an American delegate to the recent conference of the International Special Committee on Radio Interference at Lucerne, Switzerland.

The purpose of the meeting was to review progress in the development of methods for measuring radio noise interference and to discuss the possibility of an international agreement on the instrumentation to be used.

Equipment Donation

The Signal Corps, during the past year, has initiated donations of equipment to approximately 3,500 schools and educational institutions representing all 48 states and the District of Columbia. Material amounting to more than $6,000,000 has been delivered and many additional requests are in process of being filled.

These contributions are made under a Department of the Army regulation which authorizes the Chiefs of Technical Services to donate certain classes of excess material to educational institutions.

EQUIPMENT by AUTOMATIC ELECTRIC

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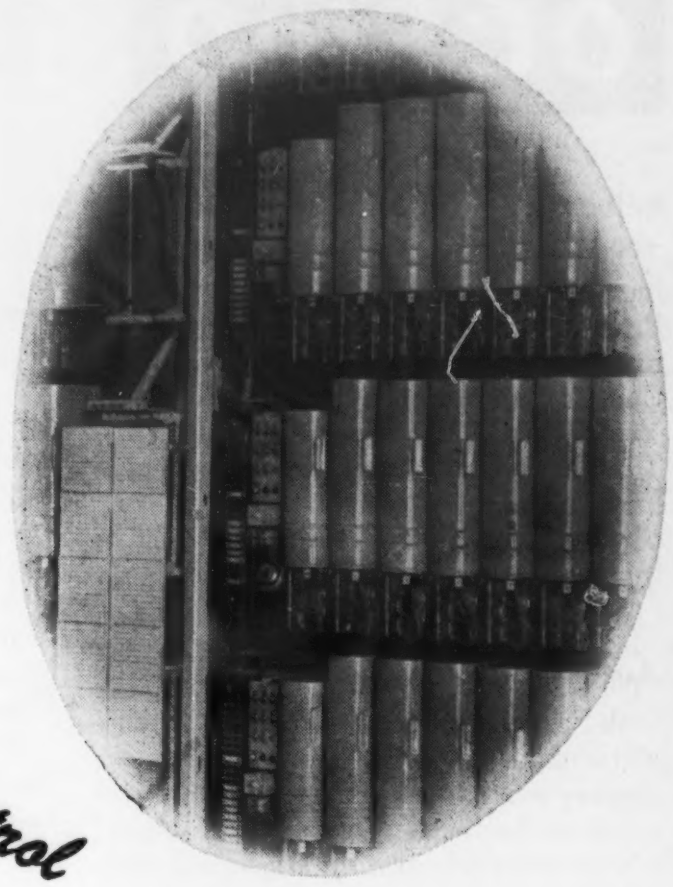

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Shown here are just a few representative Automatic Electric products. In this broad line, you will find just the unit you need to solve almost any problem. Ask for further information on Automatic Electric components for communication and for control; or put your problem up to Automatic Electric engineers. Your inquiries will receive prompt attention.

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OCSigO

Relocation

The Signal Corps Plant Engineering Agency has been moved from Philadelphia to the Pentagon Building and the Army Communications Commercial Agency, located in New York City, has been discontinued. The functions of the latter agency have been transferred to the Office of the Chief Signal Officer in Washington.

Automatic Weather

A Signal Corps development which attracted much attention at the recent display of meteorological equipment at Andrews Field was an automatic weather station designed to replace manned stations where it is impossible to maintain observers.

This equipment contains elements for measuring atmospheric pressure, temperature, relative humidity, wind direction, and rainfall. A coding device takes the readings of the various weather instruments and converts these readings to Morse code signals which are sent through a radio transmitter to the receiving point.

Signal Corps Board

Major General Spencer B. Akin has assigned the following officers to the Signal Corps Board: *Permanent Members*—Brigadier General Francis H. Lanahan, Jr., Commanding General, Fort Monmouth; Colonel Leland H. Stanford, Colonel Amory V. Eliot, Captain Fred J. Frank, and Captain Joseph P. Chase, Jr. *Associate Members*—Colonels Elton F. Hammond, A. J. Mandelbaum, Paul L. Neal, and Louis J. Tatum.

The Signal Corps Board serves in an advisory capacity to the Chief Signal Officer and continuously studies and reviews all aspects of Signal Corps activities to ascertain whether they are consistent with current military and commercial trends and with existing military requirements.

Supply School

Fourteen Signal Corps officers have been enrolled in the new fiev-month course in the Signal Supply School at Camp Holabird, Maryland.

The great need for trained supply officers in World War II and the setting up of a planned system of education for Army officers under the Gerow Board Plan, motivated the establishment o fa Signal Corps Supply School, under Procurement and Distribution Service, at the Holabird Signal Depot.

The first five-month class of the School was graduated on 27 February 1947. Brif. Gen. C. H. Arnold, Chief of Procurement and Distribution Service, gave the principal address on "Service in the Army." The graduates were Lt. Col. Maynard C. Raney, Major William M. Copley, Jr., Captain Emile W. Daniel, Jr., Captain Lester W. Kale, Captain Burwell B. Jackson, Captain Clayton H. Moore, Jr., 1st Lt. Hugh N. Armstrong, and 1st Lt. Hubbard T. Plunkett, Jr.

The Signal Corps Supply School has been assigned the mission of training selected officers for supply duty in the Signal Corps or with Army Ground Forces in Signal Corps depot operations, both in the Zone of the Interior and in theaters of operations; in procurement procedures; in supply requirements and control methods; in equipment and materiel identification; use of supply and technical publication; and in management.

The School stresses the functional rather than organizational approach to the subject and courses are taught on a developmental basis. Class and on-the-job training are integrated to show the coordination between the various phases of supply. Instruction is given by means of demonstration, lecture, conference, critique, practical work problems, student officers' reports, and examinations. Charts, diagrams, film strips and other training aids are employed to illustrate the features and practical applications of each subject being studied. The textbook prepared for each school subject is based on peacetime supply operations, supply experiences in World War II, and combat reports. Student officers receive on-the-job training under actual operating conditions in selected jobs in depots and agencies. In order to coordinate Signal Corps supply operations and activities with commercial business and industrial plants, a number of planned visits of inspection are made to selected establishments. Results of these visits are most valuable. A continuous and final testing program is conducted. Progress during the various courses of instruction is checked by instructors and records maintained, with a high standard required at all times.

Toward the end of coordinating all supply training activities in the Signal Corps, the School has also engaged in a number of special projects, including the preparation of a Warrant Officers' Signal Supply examination; four supply courses for the Extension Division of the Signal Corps School; and a Training-In-Industry survey for the purpose of training selected Signal Corps officers in industry.

All units of the class and one-the-job instruction were conducted either by, or under the coordination of the School staff under the direction of Colonel Harrod G. Miller, School Commandant. Expert instructors are drawn from various Signal Corps agencies, including Storage and Issue Agency; Supply Control Branch, OCSigO; Plant Engineering Agency; Signal Engineering Laboratories; Signal Depot.

A marked "supply training consciousness" has been noted in all the agencies of the Procurement and Distribution Service. Some of the School training techniques and text materials haev already been incoroprated in the various agency and depot training programs.

Arnold

Brig. Gen. Calvert H. Arnold, Chief of Procurement and Distribution Division, Office of the Chief Signal Officer, was one of the principal speakers at the recent Army-Industry Meeting at Camp Lewis, Washington.

Discussing the Signal Corps industrial mobilization program, General Arnold said, in part: "We are approaching our industrial mobilization job from both the military and civilian standpoints. Since the biggest stake in an industrial mobilization plan is held by industry itself, we are counting on industry to do a large part of the planning.

"Through the medium of the Army Signal Association, which in the first year of its existence has firmly established itself as an essential part of the preparedness program, we will secure the benefits of the combined knowledge and experience of the best talent in the communications and electronics industries. It is the hope of all that through the joint efforts of industry, the Army Signal Association, and the Signal Corps, we will be able to formulate plans for industrial mobiliaztion which will be realistic, practical, and capable of rapid implementation."

R.O.T.C. National Guard Organized Reserve

Industrial Courses

Faculty instructors of the Industrial College of the Armed Forces, Washington, D. C., will present condensed field versions of the ICAF course to qualified Army, Navy and Air Force Reserve officers, industrial leaders and educators, Brig. Gen. Edward B. McKinley, Commandant of the institution, announces.

Beginning in January 1948, short courses in vital aspects of industrial mobilization will be given in each of the six Army Areas, which will be allotted quotas for Reserve Army, Navy and Air Force officers. Instructors will go into the field to avoid having students travel to Washington, and to effect a time saving. Subsequent to the current school year, each Army Area will have at least one two-week condensed course during the regular 10-month academic year.

NG Figures Encouraging

Federally recognized National Guard officers now substantially outnumber the highest officer strength of the National Guard in the period of expansion shortly before induction into Federal service in 1940, Major General Kenneth F. Cramer, Chief of the National Guard Bureau, said recently.

On 1 November, more than 15,200 officers had received Federal recognition in a process that began in June 1946, when active reorganization of the National Guard began; and an additional 1,300 officers have applied for Federal recognition. In June 1940, there were approximately 14,500 officers and 227,000 men in the National Guard.

The strength of the guard on 1 November was approximately 150,000 men—more than 30,000 of whom enlisted during the first four weeks of the nation-wide recruiting campaign which began 16 September. Goal of the two-month drive is 88,888 new recruits, or a man a minute.

"The National Guard is well on the way to acquiring the high-quality leadership necessary to meet the strict standards set up for both officers and men in the post-war organization," General Cramer said.

Officers are chosen through a strict system of selection and must be prepared to assume the same responsibilities as those of the Regular Army. In addition to meeting the physical and mental standards required by the Army, they must have at least six months honorable active service in World War II. Second lieutenants may be commissioned from among qualified enlisted men of the first three grades whose war records prove their professional fitness.

ROTC Manual Distributed

Distribution of the first of four 850-page volumes of ROTC textbooks, being published by the Army for junior and senior ROTC students, began 27 September.

The manuals, furnished without cost for use of ROTC students, consist of one volume for the junior ROTC and three volumes for ROTC ground and air students in colleges. The first text published is Volume One of the senior manual series.

Approximately 184,000 volumes will be published: 71,000 of the senior manual, Volume One; 77,000 of the junior manual; 23,000 senior manual, Volume Two; and 13,000 senior manual, Volume Three.

The junior manual, covering all subjects in the curriculum of junior ROTC units, will be distributed in late October. Volumes Two and Three of the senior manual will be printed in November, with shipments to be made in late November and early December.

The entire ROTC course of study will be incorporated in the four volumes except for tactics and techniques. Senior manual One covers the first two years of senior schooling, the Second covers branch immaterial subjects for the third year of senior work, and the Fourth volume covers branch immaterial courses given in the final year.

The new manuals will supersede field manuals entirely for common subjects. Field manuals will be used, however, in the study of tactics and techniques applicable to the various branches of the Army and Air Force.

New Warrant Officers

Under a program designed to offer permanent warrant officer status to qualified enlisted men through competitive examinations, the Department of the Army and the Department of the Air Force announce that on 1 January they will open a 5,000-man procurement program for a permanent Warrant Officer Corps.

Part of a broad career guidance schedule, the plan envisions the progressive advancement of enlisted men from the grade of private to the equivalent of major—the fourth warrant officer grade. All four warrant officer grades will carry with them pay and allowances equivalent to those of the four lower commissioned officer grades.

To establish this program within the Army and Air Forces Departments, legislation will be submitted jointly to the 80th Congress. Following the submission of applications for permanent warrant officer status, beginning 1 January, appointments will be made in the summer of 1948. An Army-Air Force Circular in preparation will explain procedures on procurement and submission of applications.

N. Y. Reserves Meet

In the first Fall meeting of four Organized Reserve Signal Groups—the 133d, 142d, 150th, and 158th—held at the Western Union Auditorium in New York City, more than 400 officers and men witnessed a lecture-demonstration by Dr. J. O. Perrine, Assistant Vice President of the American Telephone and Telegraph Co. He discussed the fundamentals of electric wave phenomena in communications.

With special apparatus Dr. Perrine held the attention of the audience for two hours as he and his able assistants "visualized" wave concepts, frequency and amplitude.

The basic physical concepts of wavelength, frequency and amplitude of waves were illustrated mechanically on specially designed demonstration apparatus. Following the visualization of wave concepts by standing mechanical waves along a 20-foot piece of rope, a standing electrical wave Lecher wire system was shown. By comparison, the wavelength and

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Federal makes and installs all the equipment a broadcasting company needs for a complete FM station, from microphone to radically new power-multiplying antennas, all precision-matched for maximum efficiency. The outstanding quality and performance of Federal broadcast transmitters reflect the world-wide research and exacting engineering standards of I T & T.

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I T & T has installed and operates the radio stations connecting most of the countries of South America by radiotelephone with 95% of the telephones of the world.

RESEARCH AND DEVELOPMENT

I T & T research and development activities have been responsible for an outstanding record of contributions in the field of communications as well as electronics.

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I T & T companies, world-wide pioneers in radio navigation research, are today manufacturing and further developing electronic aids for safety in air transportation.

MARINE COMMUNICATIONS SALES AND SERVICE

I T & T associates operate 7 U. S. marine communications shore stations and have 152 sales-service agencies at principal world ports.

TECHNICAL AND ADVISORY SERVICES

I T & T technical and advisory services are supplied to certain government telephone systems as well as to privately owned telephone operating enterprises.

EXPORT

I T & T maintains an export department which supplies its customers their complete requirements of electrical equipment, including products of other manufacturers.

America's World-Wide Leader in Communications, Electronic Research and Precision Manufacture

frequency concepts of electrical waves were made understandable. Visualization of 143-centimeter waves, corresponding to a frequency of 210 million cycles, was accomplished by fluorescent tubes.

The Lecher wire system made the radio wave demonstration understandable. Micro-radio waves of three centimeters (10,000 million cycles per second) were generated. The phenomena of reflection, polarization, and absorption were demonstrated, as were the focusing of microwaves by a concave mirror and by a slotted metallic lens. The existence of the waves was shown by fluorescent bulbs about the size of a small orange. Wavelength was measured by means of standing waves in space, as revealed by slender neon tubes.

The basic concepts of radar were presented. Demonstrations of microwaves produced by an oscillator employing a magnetron of 50-kilowatt peak power output, similar to those used in radar, were made. These waves were transmitted through a flexible tube—the wave guide.

In connection with the demonstration of the properties of microwaves, Dr. Perrine explained the imperative necessity for shorter and shorter electric waves in the development and use of radar for seeing and measuring angle and distance of enemy targets in war. The "heart" of a radar receiving system, the cathode ray tube, was shown and its measurement of time in microseconds was illustrated. The measurement of time to an accuracy of .03 of a microsecond by a cathode ray tube system was one of the outstanding technical achievements of the radar research and development program during the war. This corresponds to a measurement of distance about 15 feet at ranges of 50 or more miles.

This time accuracy of .03 microsecond is not, however, as precise as is required in coaxial cable manufacture. In this case, to detect reflection from impedance irregularities, a method similar to that used in radar, using a calibrated oscilloscope, measures echoes and the location of their source with an accuracy of .01 microsecond. This represents a distance of about five feet.

As a final feature of the demonstration, Dr. Perrine transmitted speech and music over a miniature 3-centimeter wave system.

The 158th Signal Group, Col. J. J. Berhalter commanding, the first in the metropolitan area to plan an active training program, has divided its 1947-48 schedule into three definite categories:

(a) Four general meetings, such as that in September, which will be held in cooperation with the other Signal Groups and will be addressed by outstanding speakers from the military service and the communications industry. In November, there was a conducted tour of the United Nations at Lake Success and a description of U. N. Communications by General Stoner. In February, it is hoped to secure Major General S. B. Akin, the Chief Signal Officer, as guest speaker; in June a guided tour of the Fort Monmouth Laboratory installations and of the Signal School, is planned.

(b) Four Group Unit meetings are scheduled, with topics of general interest to all Signal Reserve officers and men. The October meeting covered Atomic Energy for Military Purposes and Signal Security. The January meeting will deal with Combined Operations and current Army Organizations. The March meeting will orient the men on Radio Communications and Signal Supply; the May schedule calls for a guided tour of the Signal Corps Photo Center at Astoria, L.I. and a short talk on the role of the Signal Corps in Public Relations.

A minimum of four specialist meetings—making 12 for the current training year — is contemplated. Classes have been established for Signal Operations; Radio; Radar; Telephone and Telegraph; Photography; and, Security and Supply. In each of these classes, Signal Corps officers with wartime and combat experience have volunteered to conduct training. There are five radio specialist training meetings, which will be scheduled so as not to interfere with the eight general meetings. On 14 October, the first meeting dealt with development of signal communications equipment through the war years — shortcomings, salient features and projected solutions.

On 9 December radio nets in Army, down through Division and including air-ground and artillery and tanks, will be discussed. On 20 January the subject will be Frequency Modulation; on 9 March, the function of fixed radio communication and associated problems; on 25 April, the preparation of SOI and the assignment of frequency and call signs.

The staff of the 158th Group is: Col. J. J. Berhalter, Commanding; Col. M. H. Ralph, Deputy C.O.; Lt. Col. W. E. Appleton, Exec. Off.; Lt. Col. H. C. Anderson, Adj.; Maj. S. M. Whalen, S-1; Lt Col. B. J. Brady, S-2; Col. A. M. Elliott, S-3; Lt. Col. C. R. Brearty, S-4; and Col. B. Kalisch, Pub. Inf. Officer.

Training officers are: Maj. J. E. Donnelly, Operations; Maj. H. T. Luscomb, Telephone and Telegraph; Maj. A. D. Owen, Radio; Maj. E. R. Matthews, Radar; Maj. R. T. Slauvelt, Photography; Maj. J. M. Boswell, Security; and Lt. Col. J. G. Labedz, Supply.

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989 Sig Svc Co.

The 989th Signal Service Company (Fixed Radio) has been activated as a Class "C" Reserve Unit under the command of Captain Howard C. Christian, Signal Corps Reserve. Headquarters is designated as Fort Worth, Texas. Former members of the old 989th are invited to contact Captain Christian and join in the comradeship enjoyed by this excellent signal outfit.

Intelligence Reserve

Department of the Army Circular 208 announced new and attractive opportunities for appointment in the Military Intelligence Section of the Officers' Reserve Corps, up to the grade of Colonel. The opportunities for the Counter Intelligence Corps Specialization of the Military Intelligence Reserve are equally available to individuals with or without previous military experience, who possess technical knowledge or skills closely adaptable to the type of duties performed by agents of the Counter Intelligence Corps.

Basic requirement for all grades is a bachelor degree in accounting, business administration, economics, journalism, engineering, or in related or included fields. Military experience, when used as qualification for commission, includes enlisted service with the following MOS: 301, Criminal Investigator; 631, Intelligence NCO; and 1301, CIC Investigator.

Professional experience can include administration, writing, research, teaching, or full time employment in a managerial, supervisory, or technical level in the following fields: legal, low enforcement, public and property protection, engineering, accounting and auditing, journalism and writing, economics, business administration, commercial investigation.

Letters TO THE EDITOR..

Sir:
"Additional consideration has been given your proposal in your letter of 3 September to Secretary Forrestal. The opportunity for Naval personnel—especially those with communications and photographic interests—to participate in the activities of your Association, is appreciated. It is felt that such personnel might well benefit and enjoy the personal contacts thus made available as well as the opportunity to read and contribute to "Signals." To this extent the Navy will be pleased to have Naval participation in your Association.

"However, the Navy Industrial Association is still doing a fine job in handling our problems, and you will appreciate that the Navy cannot, at this time, advocate that the members of the Navy Industrial Association join another organization with over-lapping objectives.

"Thank you for your offer to help. Let me wish your Association every success."

Sincerely yours,
JOHN L. SULLIVAN
The Secretary
of the Navy

Sir:
". . . I had given thought to forming an ASA chapter here. I discussed it with Bob Miller who advised me that George Dixon has just started on the idea. I was glad to hear it, and dropped my plans, since I felt that it was more in the spirit of ASA for a Reserve, rather than a retired Regular, to take the initiative. However, we hit a snag on the number of available members which George explained in his letter of Oct. 1st. I hope this can be straightened out.

"In writing the Constitution for our proposed Association, and using the ASA Constitution as a guide, I hit several snags. One was 'American citizen'; the others were 'patriotic' and 'defense.' Since we will have Brazilians, English, Australians, Canadians, etc., it is difficult to define what they should be patriotic toward, and what they should be interested in defending.

"I mention the above in case the ASA should give some thoughts to foreign chapters, especially outside of occupation areas. We who are in business abroad must constantly think of the nationals of the country in which we are earning a living, and also of citizens of certain foreign countries who are doing likewise. Perhaps there is only one term—'world peace'—that we could adopt as our raison d'etre, that would not offend either the country we are in, or the other members which we would like to include.

"I have long felt that communications have contributed immeasurably to the enlightenment of the world, and that wars spawn and thrive on ignorance. Perhaps ASA chapters, suitably constituted for foreign application, might contribute their mite toward better understanding. However, believing in insurance, if not being a sceptic, it is encouraging to see the growth at home, of the ASA."

HERBERT G. MESSER
Colonel, U.S.A
(Ret.)

Sir:
"All of us active and old-time Signal Corps and service people would naturally like, first of all, to see a chapter of the ASA organized here. . . .

"In the meantime, I believe that we will decide to go ahead with the idea of a general unrestricted 'Communications Association of Rio,' including all nationalities and classes of communication-interested people in this area.

"This association would be of mutual interest to us all and, perhaps, of real assistance ,and could form a vehicle which might be of untold value to the future national defense of not only Brazil but of all those countries represented here which are interested in the real peace of the world. . . .

"I'd like to tell you at this time that I think you are getting out a splendid magazine in your 'Signals' and I am sure it will go a long way toward helping bring up the active membership of the Association to a point really representative of what the Signal Corps and Army and Navy communications hold in our national picture."

Sincerely,
GEORGE P. DIXON
Rio de Janeiro,
Brazil

Sir:
"On March 3 of this year the Signal Corps celebrated its 84th birthday. The date marked 84 years of outstanding service and pioneering in behalf of our country.

"The day was observed in Washington with a luncheon by the Washington Chapter of the Army Signal Association at which the Secretary of War, the Honorable Robert P. Patterson, was the principal speaker. Other chapters of ASA and Signal Corps installations took note of the occasion in various ways.

"Not half enough people know what the Signal Corps has done, not only from the standpoint of military communications, but in such achievements as pioneering the weather service, aviation, communications in Alaska and many others.

"Therefore, I would like to ask Army Signal Association members for suggestions as to how we can make our 85th birthday, which will be on 3 March 1948, an occasion for bringing home to the entire country what the Signal Corps has done and is doing, and how it and industry are cooperating to give us the finest communications possible."

BRUCE QUISENBERRY
Capt., Signal Corps
Chief, Inf. Sec.,
OCSigO

Sir:
". . . The 37th Division Signal Company of the Ohio National Guard of Columbus, Ohio took part in Operation Overpass II, a CPX held by 2nd Army at Fort Meade, Md., Sept. 6th and 7th. Major Roger Lindley, the Division Signal Officer, and 24 enlisted men operated the division switchboard, and the message centers of the division and each of the Regimental Combat Teams of the Division.

"A total of 8 divisions from the civilian components were represented in the problem. Four NG and four Reserve divisions plus other separate units, with the addition of the Air Force, Navy, and Regular Army, made up the organiaztion of the 2nd Army.

"Among the 2nd Army units was the old 51st Sig. Bn., which assisted us in getting our signal work set up. As a veteran of the 5th Army in Italy, I was well acquainted with this unit. . . .

"As a former Italian campaigner, I would like to see more articles on signal operation in the MTO. I served in the 3133rd Sig. Svc. Co. of the 5th Army, and units of the 3131st Sig. Svc. Group at AFHQ, Caserta, Italy after the war. Your picture of Vesuvius erupting in the December 1946 issue was taken from the Carditello transmitter detachment of AFHQ where I was stationed for 4 months."

Yours truly,
ROY TUCKER
Sgt., ONG, SC

EMPLOYMENT

EMPLOYMENT SERVICE

This space is available, without charge, to individual and Group members of Army Signal Association. Please include a brief outline of education and experience. Print or type where possible. Do not send photographs. When inquiring about positions listed, refer to the number preceding each item. We particularly invite Group Members to use this service in obtaining qualified personnel for employment. Address all applications or inquiries to: Employment Service, Army Signal Association, 804 — 17th Street, N. W., Washington 6, D. C.

Positions Open

1. Electrical Engineers with electronic experience for receiver and transmitter design (includes radar), tube development, design and development of measuring equipment, and standardization of component parts.

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2. Electrical Engineers or Physicists for research and deevlopment in all fields of electronics.

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3. The Alaska Communication System is in need of two qualified Communication Engineers in the grades, P-2 and P-3, Signal Equipment Technicians, for duty in Anchorage, Alaska. Must be experienced on all types of signal communications equipment. Salaries (including overseas differential): P-2, $4,246.50; P-3, $5,187. Inquiries may be addressed directly to the Commanding Officer, Alaska Communication System, 550 Federal Office Building, Seattle 4, Washington; or to the Office of the Chief Signal Officer, Army Communications Service Division, Attention Lt. Col. A. R. Bech, Room 5D266, Pentagon, Washington 25, D. C.

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4. The Brazilian Army Technical School needs a qualified American instructor to teach ultra short wave theory and practice. Civilian preferred (Army or Navy Reserve) who has taken MIT civilian or army radar course and had military experience during war with U. S. equipment. Interested persons should write directly to: Colonel Armando Dubois Ferreira, Director of Transmissions, Brazilian Army, 4th Floor, Ministerio de Guerra Building, Rio de Janeiro, Brazil.

Positions Wanted

1. Engineer with BSEE, majoring in power, from University of Illinois; New York State Professional Engineering License. Two years in Engineering Dpartment large utility: line calculations and system analysis, preparation of substation schematic and general wiring diagrams, interconnection of supervisory control equipment, meter and relay panel layout, preparation of standards, structural design, steel detailing, checking electrical and structural installations preparation of Bills of Material, writing requisitions and drafting. Four years in AUS as Technical Officer in radar platoon. Desires position for which qualified.

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2. 3½ years Electrical Engineering, Texas Tech. and Purdue. Employed in Engineering Department of major 50,000-watt radio station since 1936, except 40 months in Army. Read, write, speak Spanish. Interested in Central or South America.

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3. Photographer with 12 years continuous experience with all types of studio and field equipment; experienced in engineering projects, construction, interiors, still life and portraits—black and white or color; have made photomicrographs in color and monochrome, both polarized and normal light; photo-elastic stress analysis tests and oscilloscope screens; also color stereo work. High speed motion picture films of high velocity hydraulic model tests; motion pictures for visual education, public relations and sales promotion. Four years in Signal Corps still and motion picture photography. Member, Society of Motion Picture Engineers.

"The social and economic patterns that have characterized states and nations for ages were evolved when men were dependent on trade winds and ocean currents, on rivers and valley routes for trade and intercourse. The ocean barriers and mountain walls that once separated them from competitive patterns have been hurdled and, despite arbitrary political barricades, all peoples now live in a small world."—Gen. of the Army Eisenhower.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the act of Congress of August 24, 1912, as amended by the acts of March 3, 1933 and July 2, 1946, of Signals Magazine, published bi-monthly at Washington, D. C., for October 1, 1947.

City of Washington } ss.
District of Columbia }

Before me, a notary public, in and for the State and County aforesaid, presonally appeared Harold J. Wheelock, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Signals Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Army Signal Association, 804 17th St., N.W., Washington, D. C.

Editor: Brig. Gen. S. H. Sherrill (Ret.), same address.

Managing Editor: Harold J. Wheelock, same address.

Business Manager, Harold J. Wheelock, same address.

2. That the owner is: (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company or other unincorporated concern, its name and address, as well as those of each individual member, must be given).

Army Signal Association, Washington, D. C.

President: David Sarnoff, 20 Rockefeller Plaza, New York, N. Y.

1st Vice Pres.: William J. Halligan, 4401 W. 5th Ave., Chicago 25, Ill.

2nd Vice Pres.: Darryl F. Zanuck, 20th Cent. Fox Film Corp., Hollywood, Calif.

3rd Vice Pres.: A. W. Marriner, 67 Broad St., New York, N. Y.

Executive Secretary and Treasurer: Brig. Gen. S. H. Sherrill (Ret.), 804 17th St., N.W., Washington 6, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

HAROLD J. WHEELOCK, Bus. Mgr.

(Signature of editor, publisher, business manager or owner.)

Sworn to and subscribed before me this 17th day of September, 1947.

[Seal] JESSIE N. GRYMES
Notary Public

(My commission expires May 31, 1952.)

CHANGES IN KEY PERSONNEL

SIGNAL CORPS:

Retirement

Colonel Clay I. Hoppough is under orders to be relieved from active duty and to revert to retired status effective 30 November 1947.

Colonel Frank C. Meade is under orders to be retired from active service on his own application effective 31 October 1947.

Recent Assignments
Office of the Chief Signal Officer

Colonel Rex V. D. Corput, Special Assignment Group (Boards and Committees).

Colonel Edwin R. Petzing, Special Assignment Group (Boards and Committees).

Colonel Donald H. Nelson, Personnel & Training Division.

Recent Assignments
Installations under jurisdiction of the Chief Signal Officer

Colonel Albert J. Mandelbaum, Commanding Officer, Signal Corps Publications Agency, Fort Monmouth, N. J.

Overseas Assignments

Colonel Frank J. Schaal, European Command.

Recent Assignments
Army Ground Forces

Colonel Lloyd C. Parson, Signal Officer, Sixth Army.

Colonel George L. Townsend, Hqs., Sixth Army.

Miscellaneous

The following officers have been assigned to AGO Casuals, Washington, D. C. for duty with the Army Personnel Records Board:

Colonel John L. Autrey
Colonel Robert N. Kunz
Colonel Leslie F. Lawrence
Colonel Leland H. Stanford

Billion Dollars Saved By Signal Corps

AN ESTIMATED $1,000,000,000 in critical materials was saved during the war by the Signal Corps and its 10,000 suppliers through a rigid program of conservation.

Use of substitutes or synthetics for such scarce materials as natural rubber, leather, mica and copper contributed substantially to the program; other important factors included new or modified designs, simplification, standardization, and revised manufacturing practices. Also stressed were improvements in distribution; packaging and handling equipment; and, salvage and proper use, maintenance and repair.

Curtailment of Signal Corps natural rubber allocations in 1944 disrupted a multi-billon dollar procurement program. The WPB directive prohibited its use in the production of millions of miles of wire and cable, insulation and wiring for radio equipment and rubber tape. For these and many other items, substitutes were mandatory.

While the ingenuity of Signal Corps engineers was taxed to the utmost, before the deadline, substitutes for rubber had been made in about 85% of all equipment. By use of Buna S and Neoprene, redesign of radio equipment, and other methods, more than 45,000,000 pounds of rubber had been conserved, a figure greatly augmented before war's end.

Leather was also placed on the proscribed list for the Signal Corps, which had used about 30,000 hides during the first half of 1944. By substituting cotton belting for field telephone cases, linemen's belts and tool pouches, leather requirements dropped to 3,900 hides in the last half of 1944 and further use was gradually curtailed.

Pre-war radio and radar equipment used mica capacitors but 1942 found mica stockpiles dangerously low and the Signal Corps began to limit the number of capacitors in each set. Circuits were redesigned and a study of 26 radio sets resulted in the substitution of 394 ceramic and oil-filled capacitors. In 5 radar sets alone, a total of 366 substitutions were made. When paper became scarce a low grade mica was used for low voltage capacitor applications.

Use of square, instead of round, poles saved about 400 tons of shipping weight and a substantial amount of shipping space. Some other substitutes developed or sponsored by the Signal Corps were plastic materials for flashlights, signal lamps and special light projectors; magnesium for steel, aluminum, or wood in radios, antenna masts and antenna mounts; placticized laminated paper and wood fiber for plywood; glass insulators for ceramics; shock mounts and meteorological balloons made of rubber substitutes; and inter-service electron tube specifications.

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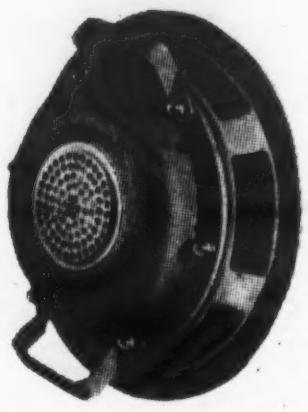
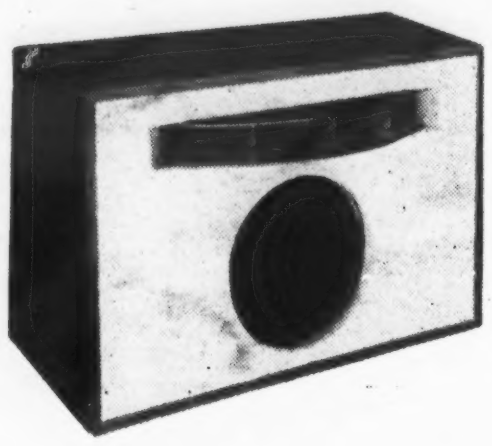
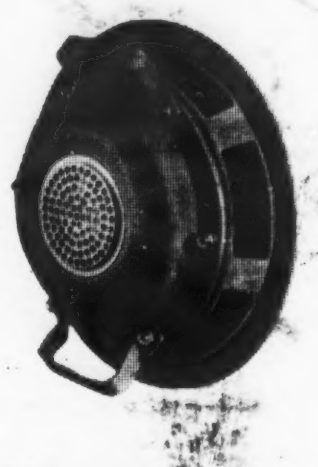


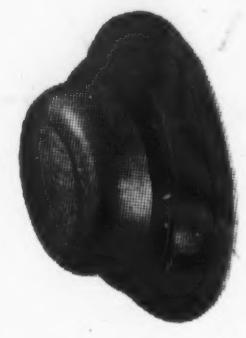
728B 12" direct radiator, 30 watts continuous capacity. Frequency response 60 to 10,000 cps.



757A two unit system, using 728B plus separate high frequency speaker. Frequency response 60 to 15,000 cps.



756A 10" direct radiator, power handling capacity 20 watts. Frequency response 65 to 10,000 cps.



755A 8" direct radiator, 8 watts capacity. Response 70 to 13,000 cps.

ACTIVE DEVELOPMENT of loudspeakers moved forward after World War I, when Western Electric produced the 196W, employing a non-magnetic diaphragm driven by an armature. First used in the Victory Loan campaign of 1919, the 196W took part in the national political conventions of 1920, the presidential inauguration of 1921, and the burial of the Unknown Soldier later the same year. Success of these pioneer public address systems rested not only on loudspeakers but also on high quality microphones and amplifiers—all Western Electric developments.

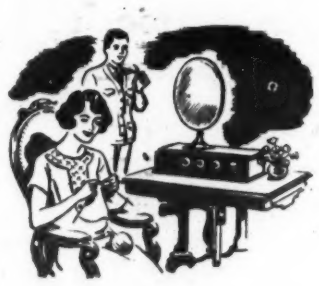
Continual progress in the intervening years has kept pace with the development in Bell Telephone Laboratories of telephone transmitters and receivers for the Bell System. Fundamental to both loudspeakers and telephones have been the Laboratories' pioneering studies in sound, speech, hearing and the theory of vibrating systems.

Sound distribution systems, sound motion pictures and radio broadcasting—all have benefited from the teamwork which has done so much to make possible today's efficient, powerful, wide-range loudspeakers.

TODAY Western Electric offers a complete line of wide-range direct radiators, high frequency speakers, horns and multi-unit systems all designed by Bell Telephone Laboratories. There's one to meet your requirements for highest quality sound whether you want an eight inch, eight watt speaker, or a giant theatre-type system with 120 watts capacity.

No matter which you select, you get the benefit of a broad experience which long antedates the public address art.

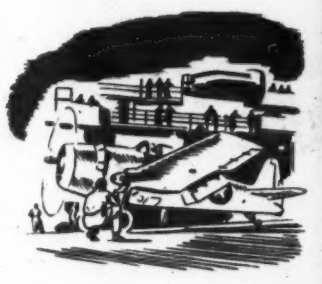
1919. New York's Victory Loan celebration pioneered the art of reaching tremendous audiences. 113 Western Electric speakers made possible this mass demonstration of the new art of sound distribution.



1924. Non-directional, small in size, yet extremely wide-range for its day, the 540 cone speaker designed for broadcasting was so popular for home receivers that it became a symbol of early radio.

1926. The 555 Receiver, with its large wooden horn, contributed to the success of sound motion pictures. From this single-unit loudspeaker grew the high quality wide-range theatre speaker systems of today.

1937. The introduction of the 750 series of loudspeakers provided the first really wide-range direct radiator. With the proper mounting, this speaker covers a frequency band from 80 to 10,000 cycles. Still a popular speaker.



1943. Battle announce speaker designed for the United States Navy hit a new high in intelligibility and power. Used on all types of Navy ships, they passed commands to fighting men over the noise of battle.

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